The Magazine For Hewlett-Packard Enterprise Computing

HP Professional

NOVEMBER 1997

HP-UX

◆

Windows NT

◆

MPE/iX

A BCI PUBLICATION

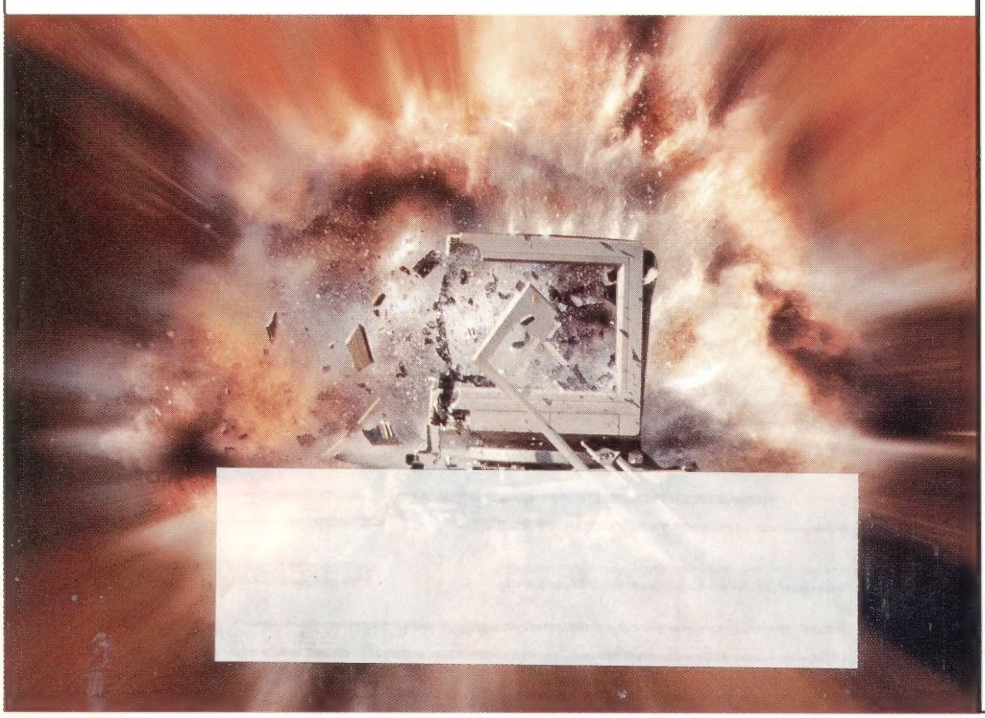
BUSINESS CONTINUITY

Full Catastrophe Computing

Are you prepared for anything and everything? Or are you waiting for the bomb to drop? If you align IT with your business processes now, you can have a blast while your competitors are dealing with the fallout. **PAGE 18**

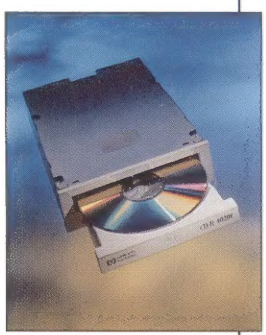
Double Jeopardy

"Years that end in zero" for $600 billion, please. Answer: This year has been the subject of a predicted dire, disturbing, and daunting computer crash. What is...? **PAGE 26**



ENTERPRISE STORAGE PAGE 38

- Trends in HP Storage
- NT Media Services
- Storage Insurance
- Memory Focus



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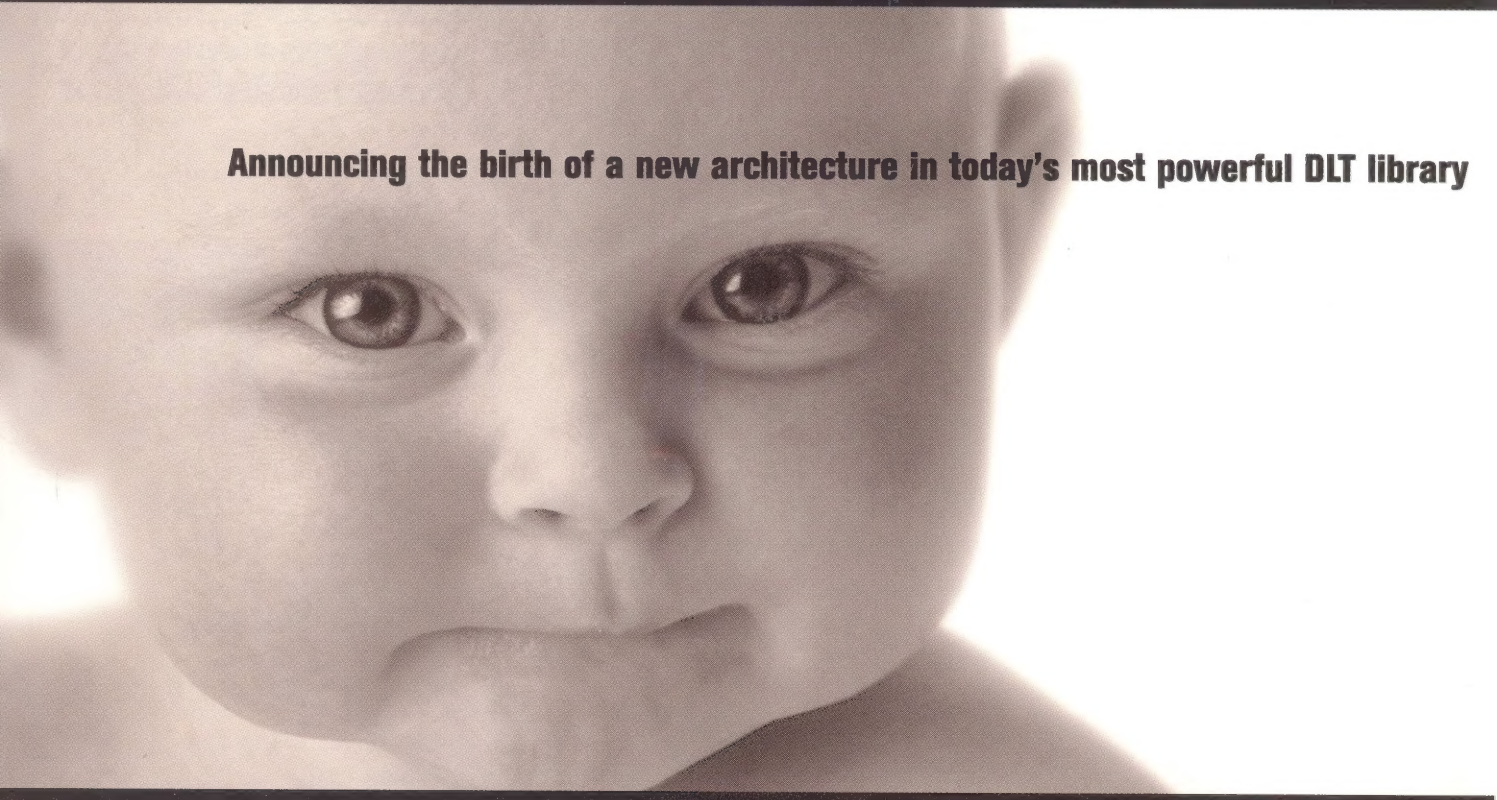

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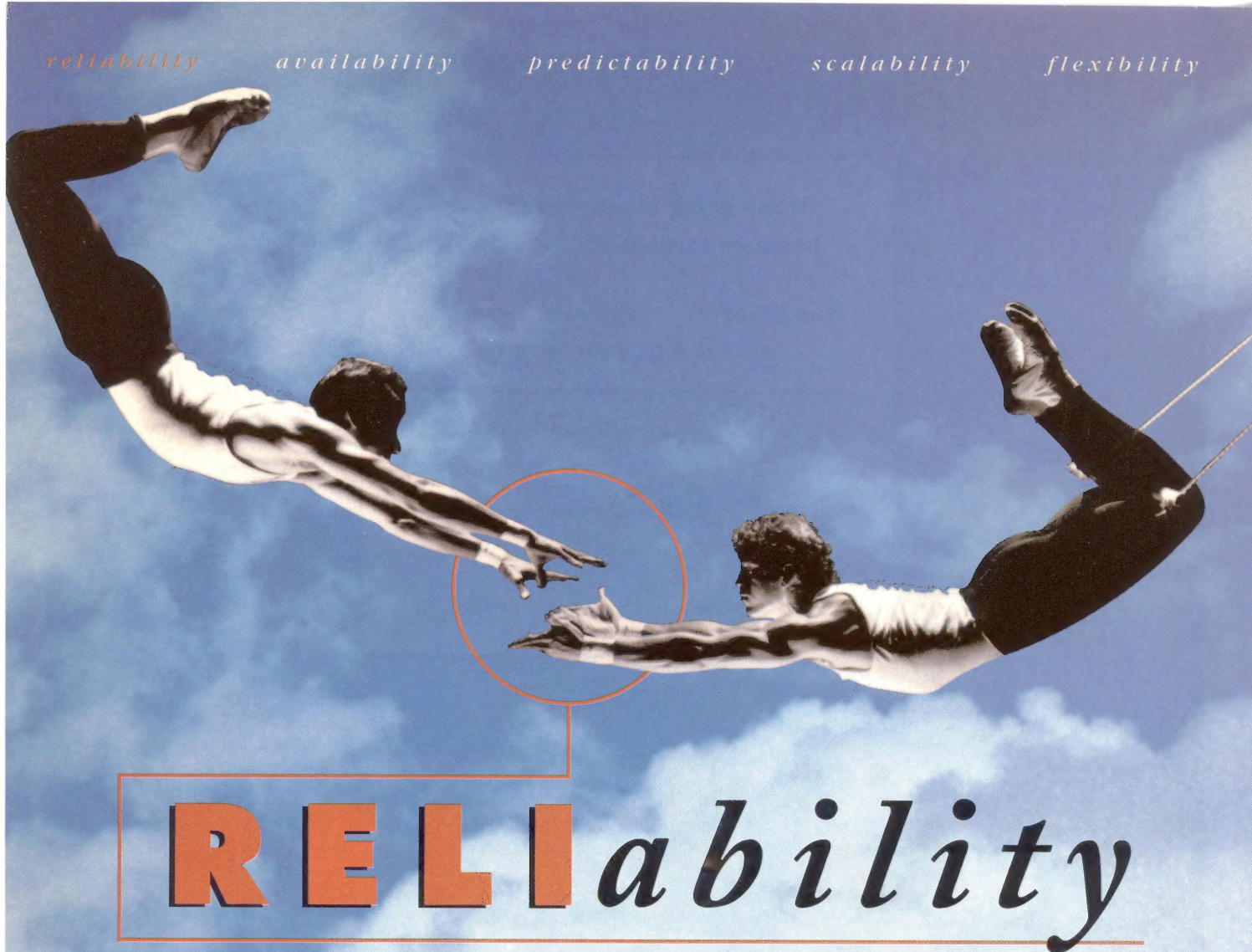

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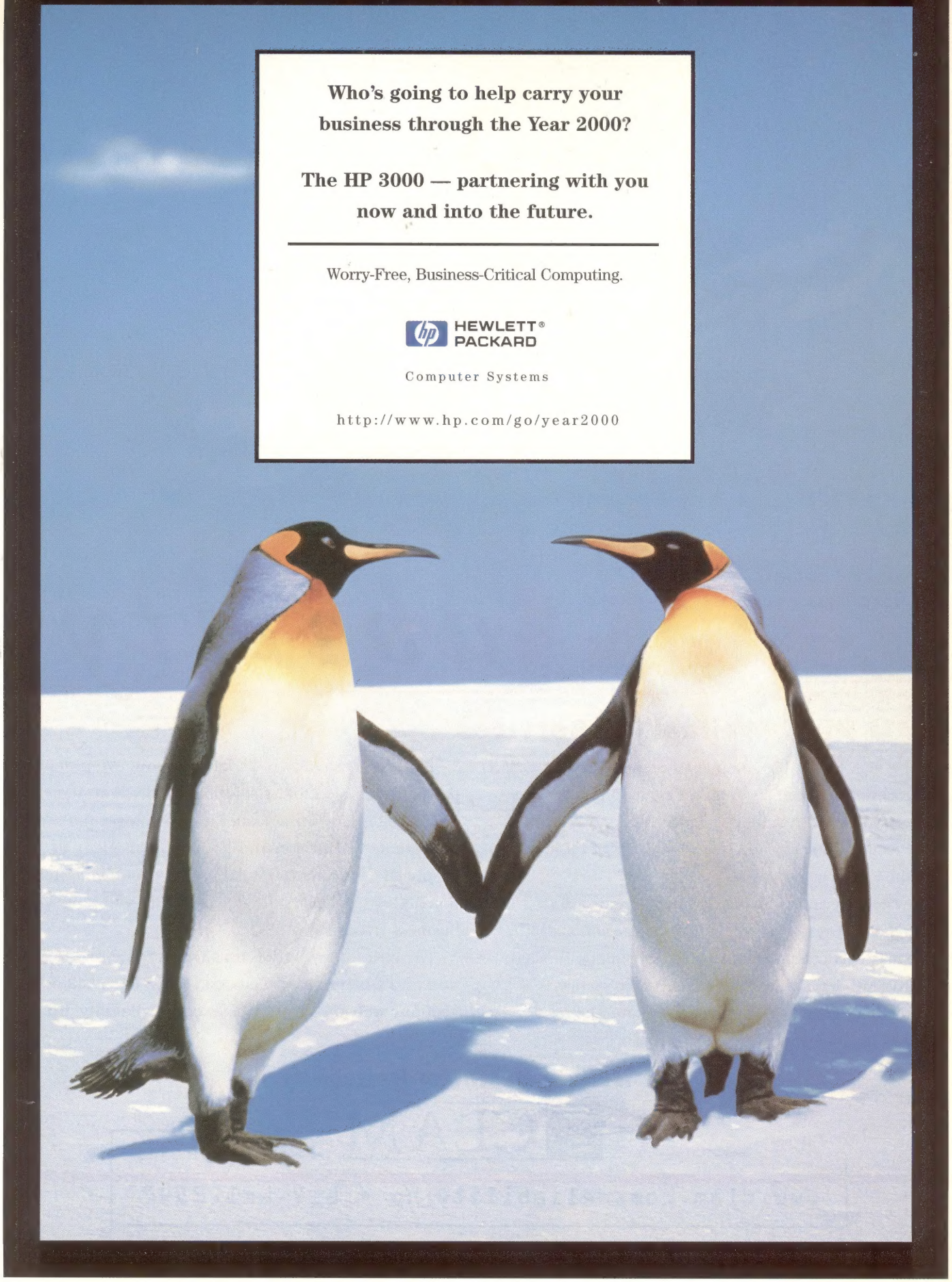

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YEAR 2000 REPORT

The Nightmare Before Christmas

By James Dukart

There are two kinds of disasters, those you can prevent and those you can't. The so-called Y2K bug falls in the former. Do you know what needs to be done before the problem becomes an uncontrollable disaster? **Page 26**

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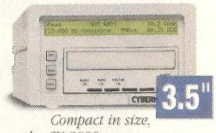
Let's face it, your backup is only as good as your tape. And all the performance in the world won't get your data back if your tape is weak or dirty. Fortunately, there's no need to compromise. The CY-8000 is the safest, the most reliable, *and the fastest* 8mm tape drive on the market.



Compact in size, the CY-8000 can store up to 125 GB on each tape.

The CY-8000 uses ***Advanced Metal Evaporated*** media, a 100% cobalt, 2-layer tape that features a diamond-like coating for exceptional durability. And it's the *only* 8mm drive with a ***built-in head cleaner*** to keep the tape path free of contaminants, further ensuring data integrity and virtually eliminating the time and expense associated with cleaning kits.

In addition to superior design, the CY-8000 offers unbeatable performance. Able to store ***25 GB at 3 MBS***, uncompressed, you can achieve up to ***125 GB at 9 MBS*** with optional data compression. With 257% more capacity and 500% greater speed* than industry standard 8mm drives, the CY-8000 can backup faster to fewer tapes.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HP-400/425/433			●	●		●	●			
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HP-700RX	● ●		●	●						
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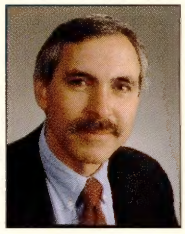


Tony Rodriguez
Chief Technology Officer
CLAM Associates Inc.

Those of us working with the complex hardware and software systems, which support the increasingly information-intensive enterprise, are accustomed to, and take pride in, watching for new technology developments that promise solutions to enduring issues such as performance, cost, availability, compatibility, usability, scalability and flexibility. That's the easy part.

The difficulty lies in getting caught up in the phenomenon of technological progress itself. Because it's easy to succumb to the temptation to see each new technological wave as an improvement, we lose sight of the fact that we don't necessarily move our information systems closer to achieving any of our organization's ultimate business goals. It's like hawking the latest exercise machine. Most of us know from experience that the most innovative, feature-laden equipment only does any good if it's incorporated into a regular fitness program tailored to meet individual needs. For example, systems managers seeking ways to safeguard their mission-critical enterprise data and applications may view advances in server and networking technology as long-awaited solutions to the pressing need for high availability. But clustering, or any other approach to high availability is only a single piece of a larger issue which extends beyond the technology itself. In this instance, the systems manager's real objective is non-stop, perpetual business operations. In other words, the ability to maintain the enterprise's business operations — no matter what.

Because a high-availability strategy ultimately affects every part of an organization, the proper planning process involves much more than project implementation planning. It begins with identifying the enterprise's business requirements and goes through establishing procedures and contingencies for end users. For each application, it's essential to carefully assess what key features are provided to end users. Does the business demand that the application be available around the clock, 365 days a year? How much downtime is permissible over the course of a year? An hour or two? As many as several business days? What are the implications of downtime for employees, customers and future business?

A typical company experiences nine system outages per year, and the average loss associated with each outage is approximately $75,000 per hour of downtime. The causes of downtime are often not hardware- or disaster-related, but rather involve scheduled maintenance and software upgrades, software defects, viruses and operator error. In the event of downtime, what length of time is expected by the organization for failover? Preparing a thorough response plan involves creating recovery procedures addressing all of these situations— procedures that are designed for end users, system operators and system components.

How can client reconnection time and data recovery be reduced after an event? How can the organization's response time to an event be shortened? Can failover be done manually by available system operators? Or, do events need to be detected instantly and handled automatically by the system? How are the system operators notified in the case of a failure? Keeping track of the many business elements as well as the interactions of the operating system, networks, databases and applications and how each affects overall system throughput and performance requires an effective planning and integration methodology and strong project management.

Once all the business requirements are agreed upon by IS and corporate management, the task of planning a comprehensive business protection strategy begins. However, we often don't spend enough time on the most essential step, because we frequently don't have the skills or take the time: to clearly document the steps that operators and end users need to follow in cases of downtime, and to train the necessary personnel to follow them correctly when downtime occurs.

HP 3000 NEWS YOU CAN USE

HP 3000 939KS/020

In November, HP announced the HP 3000 939KS/020, an entry-level, midrange server with a 78MHz PA-7200 CPU and a 2MB cache (1MB data cache/ 1MB instruction cache). The 939KS comes standard with four I/O slots; four more slots can be added. External to the chassis, 14 or 28 additional slots can be added.

The single-processor 9x9KS/020 can be upgraded to the multiprocessor 969KS, 979KS/x20 or 979KS platforms that use larger caches or the higher frequency PA-8000 CPUs. By upgrading to these higher performance platforms, support also can be added for up to four-way multiprocessing. All 9x9KS/020 processor upgrades, as well as memory additions, I/O extensions and add-on peripherals are simple field installations.

MPE/iX 5.5 Express 4

Changes promised for the mid-1998 release of MPE/iX 6.0, will be available this month in the MPE/iX 5.5 Express 4 release (available at no charge to customers on support contracts). That ensures that MPE/iX runs properly when clocks roll over to the year 2000.

Changes include fixes to data-sensitive Command Interpreter (CI) commands, the addition of several new CI variables and the updating of VPLUS to assist in dealing with the year 2000. The new MPE/iX release, as well as all subsequent MPE/iX releases, will be year 2000-compliant.

HP 3000 Series 918DX Software Developers Bundle Addressing a long-standing complaint of HP 3000 ISVs for a development system, HP is shipping the HP 3000 Series 918DX Software Developers Bundle which will consist of an HP 3000 918LX server, several compilers and tools provided by HP free of charge.

The 918LX server contains: two slots, an eight-user MPE/iX FOS, Image/SQL and Allbase/SQL; 64MB memory; 4GB hard disk drive; 4 to 8GB DDS DAT tape drive; 700/96 system console; HP Powertrust UPS (600vA); media on DDS tape; and paper documentation.

Compilers and tools from HP include: HP C/iX, HP Pascal/iX, HP COBOL II/iX, HP Business BASIC/iX, HP RPG/iX, HP FORTRAN 77/Ix, HP Transact/iX, HP Glance/iX and HP Symbolic Debugger. Products are available from Adager, AICS Research, Allegro, Bradmark, Cognos, Genesee, HICOMP, Lund, QSS, Robelle, SMM Software, Speedware, Quest Software, VESOFT and 3k Associates.

IN DEPTH, IN SHORT

SELECTIVE MEMORY

The debate is heating up over whether Rambus, a proprietary command-driven smart memory from Rambus (Mountain View, Calif.), or SLDRAM (formerly SyncLink), an open memory specification currently being developed by various semiconductor companies in the SLDRAM Consortium, will emerge as the next DRAM standard.

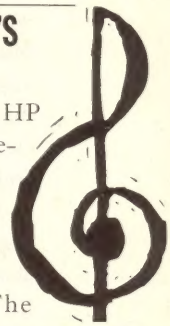
Recently, memory chip makers are up in arms about recent deals between Intel (Santa Clara, Calif.) and Rambus, claiming that Intel is making another run at cornering the memory market. Currently, Intel controls the microprocessor market, the support chip set market and the motherboard market. "[Intel's endorsement] has caused a problem with many DRAM manufacturers because they would have preferred that Intel stay neutral," says Bosco Sun, president of Camintonn ZRAM (Irvine, Calif.). "The DRAM manufacturers would prefer SLDRAM because it's not proprietary and if Intel would endorse [SLDRAM], that would help with [SLDRAM's] acceptance in the market."

Sun notes that despite this, most major memory providers are jumping on the Rambus bandwagon also. "They're hedging their bets. "And, what Intel says, people do." Because Intel is talking about product availability in 1999, it's a good bet that this is being considered as part of the architecture of their P7 chip, currently under development with HP. Their (Merced) CPU has a voracious appetite for memory, and Intel needs to keep the rest of the system moving fast enough to make the CPU look good.

Intel's decision to invest in a new memory architecture stems from concerns about SDRAM. Intel reports that SDRAM, currently available at an internal clock rate of 66MHz, is ultimately limited to 100MHz and is not a suitable architecture to support its long-term processor plans. Dataquest, however, says that SDRAM's current speed limitations will be overcome as new variations of the technology are developed.

—Deborah Schwartz, Associate Editor

SUITE MUSIC FOR HP'S OPEN WAREHOUSE



HP introduced its HP OpenWarehouse management suite — an integrated package of products for managing datawarehouse environments. The OpenWarehouse management suite incorporates a set of tested and integrated data warehouse and management applications, including HP OpenView IT/Operations, MeasureWare and PerfView. OpenWarehouse uses the MeasureWare Application Response Measurement (ARM) API to report response times to PerfView. This allows customers the infrastructure

Tough to scale

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Protect your investment in tape backup equipment with the LibraryXpress system. Begin with a base module containing one or two DLT4000 or DLT7000 drives and 10 cartridges. This will provide you with a storage capacity of up to 700 gigabytes and a data rate of 72 gigabytes per hour.

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HP DIGS INTO IMAGING

HP, Adobe Systems Inc., Canon, Eastman Kodak Co., Fuji Photo Film Co. Ltd., IBM, Intel, Live Picture Inc. and Microsoft Corp. have formed the Digital Imaging Group (DIG) — an open consortium whose mission is to promote the growth of digital imaging by defining an open and interoperable platform for imaging solutions.

Copyrights, trademarks and test suites for HP's FlashPix imaging architecture and the Internet Imaging Protocol (IIP) will be turned over to the DIG to ensure that they remain sound, interoperable technical foundations for digital imaging products and solutions in the future *(see Internet Digest, p.36).*

SWITCHSOFT SYSTEMS INC. NAMED HP OPENVIEW PARTNER

SwitchSoft Systems Inc. (Redwood City, Calif.) has achieved HP OpenView Premier Partner status, and its Visual Ping for HP OpenView Network Node Manager 5.0 tool has passed HP OpenView certification testing. SwitchSoft's Visual Ping is an implementation of the Internet Control Message Protocol. It is used to test TCP/IP networks by sending and receiving "ping" packets, which confirm network connections. Also, Virtual Network Visualizer (VNV), which is scheduled to be available this month.

WRQ PRODUCTS *REFLECTING* A NEW NAME

WRQ has renamed their venerable emulation products to, eh, reflect the changing times: Reflection 1 becomes Reflection for HP, Reflection 2 becomes Reflection for UNIX and Digital, Reflection 4 becomes Reflection for ReGIS Graphics. In addition, Reflection TCP Connection for Windows 95 has been renamed TCP/NFS Connections.

JUST FOR KICKS

HP-UX and Windows NT are Center Circle at World Cup '98

Last December, HP was selected as the technology supplier for the World Cup. Held in 10 cities throughout France in 1998, The World Cup is the largest international sporting event. HP, along with Sybase (Emeryville, Calif.) and EDS (Plano, Texas), will be supplying the computing environment as well as support and services, while French Telecom will supply connectivity within France.

The technical requirements are daunting: 2.5 million tickets for 64 matches in 10 stadiums; accreditation for 50,000 staff, volunteers and players; media information for 10,000 journalists; and compiling results and statistics for 64 matches and 32 teams. Add to that 2.5 million spectators and an expected audience of 37 billion TV viewers worldwide. Now that's an integrated enterprise.

According to Mark Hudson, HP's Internet marketing manager, although HP supplied its testing and medical equipment in the 1972 Olympics and provided support for the America's Cup, "it's the first time for HP on this kind of scale and magnitude."

By the time the World Cup closes in July 1998, HP will have used 75 different products across 10 of its divisions. "HP-UX and NT will be the two key platforms," says Hudson. Already well underway, the final configuration is expected to include 100 UNIX and Windows NT servers, 100 networks supported by HP's AdvanceStack hubs, routers and switches, 500 networked printers, 2,000 Vectra desktops and OmniBook laptops as well as palmtops and optical storage jukeboxes.

It's quite a coup for HP to trip up Sun Microsystems, the supplier for the 1994 World Cup. HP is taking advantage of the publicity to promote its HP Domain Internet servers, which will be the heart of the entire World Cup '98 system as well as the engine for the *www.france98.com* Web site, which is expected to generate between 10 million and 20 million hits per day.

Established in early May and hosted in Plano, Texas by EDS, there were over 70,000 hits from over 100 different countries in the first three weeks. The site is mirrored with one in Paris. "All the traffic from Europe will be directed through that site and it will provide added reliability as we get closer to the start of the event," says Hudson. "We're going to work closely with our colleagues in Cupertino [Calif.], with our PSO in France, with EDS and with Comite Francais d'Organisation (CFO)"

The World Cup represents not only a test bed for HP's products but a trial-by-fire for its global enterprise services. In fact, it's a global client-server-experiment for HP with virtually the entire world as its customers. HP, of course, is wary that the press can be cruel to those who fail at these endeavors. You may recall IBM's castigation at the pens of the press during last year's Summer Olympics.

This December, HP will be kicking things up a notch with its IT plans for "providing the best possible performance." That's why starting in December, *HP Professional* will be taking a behind the scenes peek at HP's World Cup preparations in a special monthly **HP's Countdown To Kickoff** section in HP News And Views.

-George A. Thompson, Editor-In-Chief

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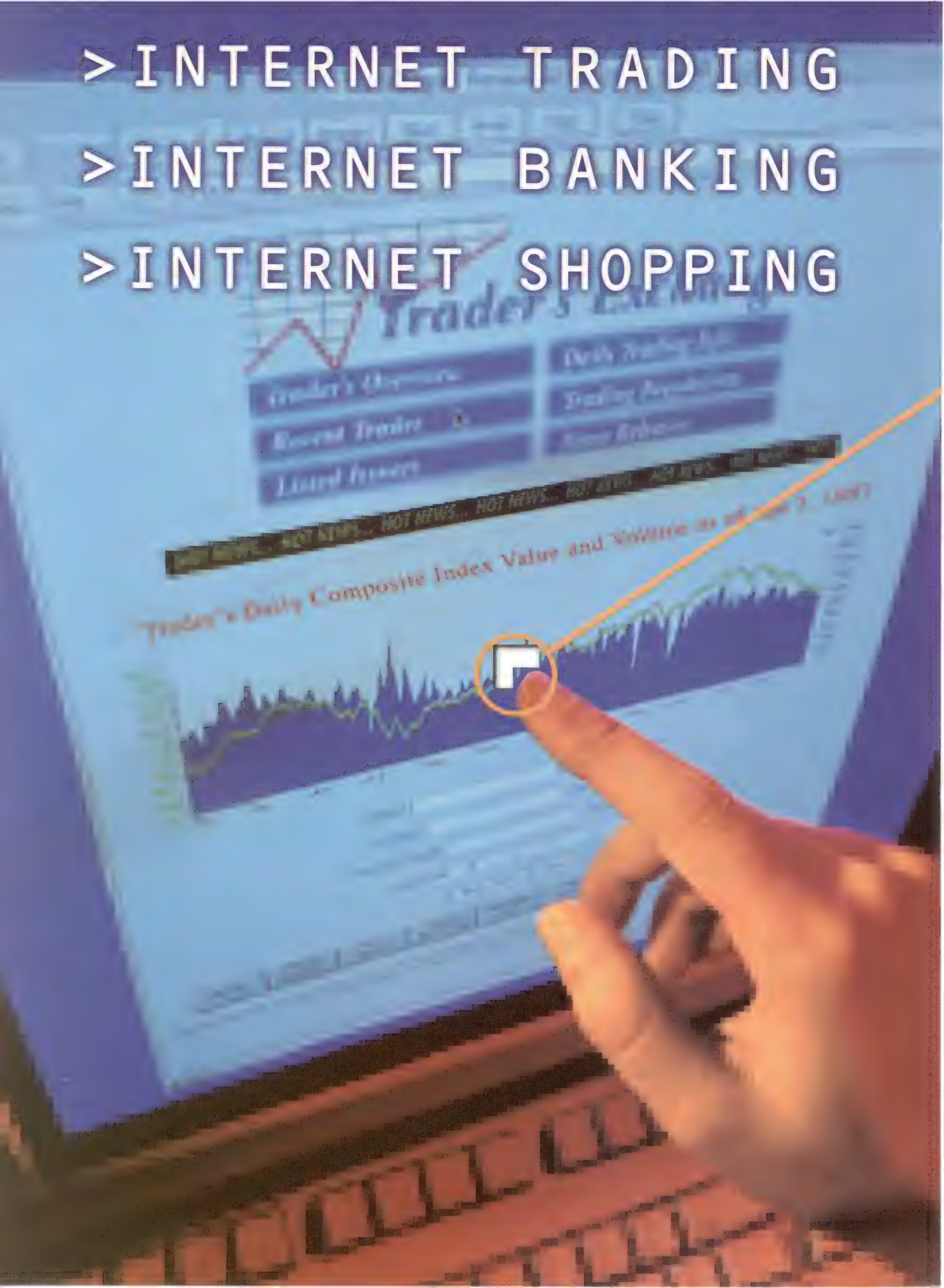
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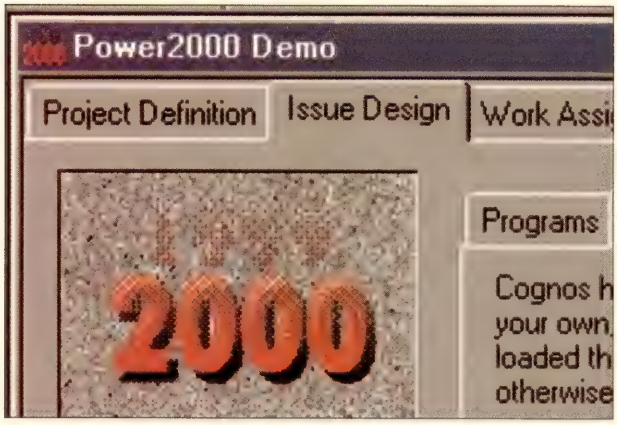

POWER2000

- Contains 600+ potential Year 2000 issues
- Reports provide assessment results such as labor estimates, date issue identification and location, and work allocation
- Starts at $15,000 per Power2000 license

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According to the Gartner Group (Stamford, Conn.), it's going to cost $600 billion to fix the Year 2000 problem. The sooner you know the scope of your Year 2000 problem, the sooner you can estimate resources and costs, and the sooner you can complete the project.

Recently, Visibility (Wilmington, Mass.), producers of a manufacturing ERP system application which contains 40 modules, used Cognos' Power2000 to make their application year 2000 compliant. According to David Spellman, vice president of Visibility, Cognos was a logical choice because the application was already written in Cognos' PowerHouse and Axiant.

Power2000 allowed Visibility to re-engineer the application as if it were written with the date fields originally. "It allowed us to apply a consistent methodology across all the code," explains Spellman. "We were able to re-engineer the code to appear as if it were written with appropriate date formats up front." PowerHouse Power2000 combines an understanding of the PowerHouse 4GL, mass editing capability and a knowledge base of over 600 potential Year 2000 issues.

Power2000 is a PC-based search tool designed to identify, assess and convert Year 2000 date issues in PowerHouse applications. It identifies date issues in your PowerHouse application, and automatically locates the source code that needs to be assessed for modification. The identified issues are then stored in a database.

Power2000's built-in editor lets you manually or automatically correct the issues found in the source code. The editor takes you directly to each issue. For a simple text replacement, define the text and make the replacement with the click of a button. You also can define macros to handle more complex replacements.

Power2000 contains a built-in knowledge base of Year 2000 issues commonly found in PowerHouse applications. You also can "teach" Power2000 about unique aspects of applications by modifying the predefined issues or creating new ones. Additionally, Power2000 is designed to recognize PowerHouse language rules such as line continuation, comments and quoted strings.

Predefined reports make it easy to develop a plan for your project and monitor progress. The reports provide assessment results based on Power2000's information, including labor estimates, date issue identification and location, and work allocation. And, you can build your own custom reports. Use it to assign work to team members, analyze your application issues and track ongoing assignments. Create separate assignment databases for each team members and "check out" the assigned programs. When team members complete their work, the assignment database is merged with the main database, and the programs are checked back in.

—Deborah Schwartz, Associate Editor

Do you think you have to leave your HP 3000 to get a client/server accounting system?

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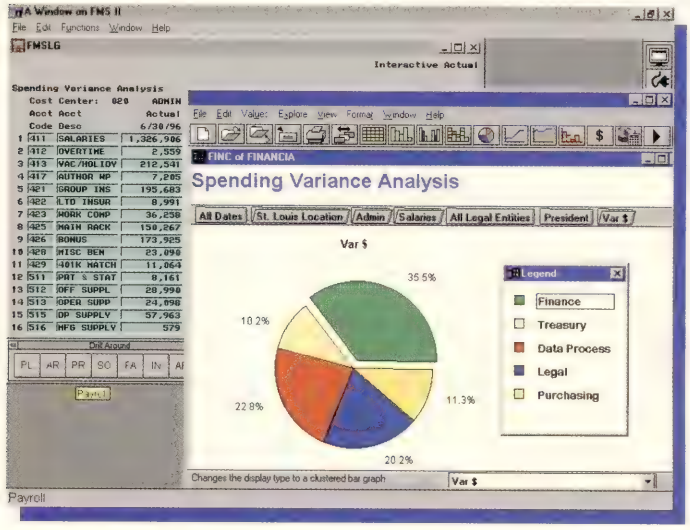

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CIRCLE 353 ON READER CARD

Glenncom Systems (Linden, N.J.) is an internetworking design firm that found the need to secure its private network information — their own corporate data as well as that of their customers — from unauthorized access through Internet connections. For Glenn Falkowski Jr., executive vice president at Glenncom Systems, securing that data was a high priority.

About eight months ago, Falkowski chose PyroWall from Radguard Ltd. (Mahwah, N.J.), a hardware-based firewall incorporating protection algorithms with an easy-to-use management system that provides complete security for private networks.

"[PyroWall] runs on its own platform," says Falkowski. "You don't need an additional operating system which can run up the price." The PyroWall operates as a "black box" and requires no extra user knowledge of complex operating systems.

PyroWall safeguards networks against outside intruders and data leakage through a combination of security features and a specially designed architecture that fits easily into a network configuration. It offers additional security by keeping the management system on a separate platform.

PyroWall's advanced security features check every message source and destination, as well as message time, inspecting data up to the application layer and, if needed, searching for data fields included in the message. PyroWall is context-sensitive, thus it continually scrutinizes each fragment of every incoming message to ensure that no hackers can "sneak" between parts of a fragmented message.

PyroWall users can define the events and thresholds that will generate alarms. All network activity is logged on-board, and PyroWall can even record entire packets. When an alarm is generated, PyroWall can automatically activate a stop-forward feature to shut down all incoming and outgoing traffic. Administrators are alerted instantly via a pager or an alarm of choice.

Radguard also provides the Wizard, a system which automatically guides users on building security policies in the PyroWall firewall. The Wizard guides the user through the toughest stage of installation: defining the security policy the user needs.

"Our goal was to automate the PyroWall installation and setup procedure as much as possible by creating a step-by-step guide for users to build a secured network protected by the PyroWall," says Eli Herscovitz, managing director of Radguard.

The security policy wizard recognizes common network setups (topologies) and graphically suggests secure setups to the user. A security policy table is then generated based on the needs and requirements specified by the user. A knowledgeable user can edit and fine-tune the generated table.

PyroWall management software runs on Windows 3.11, Windows NT or Windows 95. Price is $4,450 for one to 25 users, and $12,950 for unlimited users.

—Deborah Schwartz, Associate Editor

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It's The End Of The World As We Know It

That's great, it starts with an earthquake, data and backups, technology — sys admin is not afraid. Eye of a hurricane, listen to your bits churn — IT serves business needs, don't misserve your corporate needs. Tell me about recovery, and the way to do things right —

It's the as we know it,
and I feel

Welcome to the brave, new, network-centric world of Business Recovery Services (BRS). Also proactively called Business Continuity Services (BCS), BCS/BRS replaces what in the glass house was referred to as Disaster Recovery Services when backing up a mainframe-based data center was sufficient. Then, disaster recovery meant backing up data to tape, storing tapes offsite and contracting for "hot site" recovery areas where data could be loaded from tape and replayed on systems that mirrored those that the data center used.

It's not that customers are having any more disasters than before, "it's because they are defining disasters differently," says Bill Cronin, worldwide program manager for HP's Business Recovery Services. "They used to be able to work with a 48-hour outage, and now they cannot live with a two-hour outage."

So, if you think that "7x24x365" represents the dimensions of your data center, you had better get a grip. It represents how often your data, your system and your support needs to be available. Namely,

CIRCLE 103 ON READER CARD

every day, all day and all year.

"Now you have these huge integrated transaction processing support systems — plus a huge data warehouse. You have to back them up and restore them in a reasonable time frame," says Rich Frank, vice president for distributed systems at Comdisco Continuity Services (Rosemont, Ill.).

"The first thing that needs to be done is to understand the customers' business," says Frank. "We have to know who they are and how they make money; what the critical revenue producing systems are and what their customer interface system looks like because customers want a predictable interface into their business supplier."

According to Beverly Canfield-Woods, manager for worldwide recovery services for Digital Equipment Corp., "Many companies or business units require recovery within a few hours. The healthcare and pharmaceutical industries, she says, are indicative of this trend, where the loss of a couple of hours of evaluation time in a drug trial can delay clinical approval."

"[Business continuity] is becoming [evident] as the Internet becomes more popular," adds Donna Scott, research director for systems, network management and security at the Gartner Group (Stamford, Conn.). "Particularly if you are moving into some sort of electronic commerce capability. Recovery planning has to be end-to-end. Today, you must recover things in a synchronous fashion."

How Do You Cope?

First, determine what data is absolutely critical for the resumption of business. John Painter, marketing manager for business continuity services provider Computer Solutions Inc. (Orange, N.J.), says this determination is usually made early in a discussion about recovery services — usually as soon as a client hears the total price tag for an immediate, full recovery.

Because clients want to restore everything in their current production mode, "when we get back to them with a price, they fall off their chair," says Painter. Of course, every user thinks their application cannot be down. But if you look closely, you can find some things you can do without — for a short time at least.

"Planning helps determine what kind of data you really need," states HP's Cronin. "A financial house might need to have immediate access to very current data. But on the other hand, if I am a mail-order house and I have an inventory of T-shirts and my system goes down, I might be able to survive a bit longer without knowing just how many T-shirts I have."

"The consulting piece is definitely starting to outweigh the processing requirements," says Digital's Canfield-Woods, adding that continuous interaction with clients is the only way to embark upon and maintain effective recovery plans.

One of the main ways you can evaluate and rank critical systems is through the revenue they bring in. Estimates by the Contingency Planning Research Group (White Plains, N.Y.) show that an hour of downtime at a financial brokerage operation can cost more than $6 million dollars, while the inability to authorize credit cards for purchases can cost a business up to $2.6 million per hour. By comparison, an air reservations system that goes down can cost $89,500 per hour, or more than $2 million in a 24-hour period.

Practice Makes Perfect

Plans must also be rehearsed periodically, says Cronin, at least as frequently as

RECOVERY BY THE NUMBERS

According to a survey commissioned by Comdisco Continuity Services (Rosemont, Ill.), there are serious questions about how the growing corporate reliance on the Internet, intranets and WANs may be increasing exposure to corporatewide system disruptions. Based on interviews with more than 200 of the largest users of technology (average revenue $2.5 billion) in the United States, Canada and the United Kingdom, the survey found the following:

- Only 25 percent of the companies surveyed have a detailed written recovery plan or a testing and evaluation program for network recovery.
- Thirty-seven percent of companies are currently using the Internet or intranets for mission-critical applications.
- Forty-nine percent of the companies plan to use the Internet as a vehicle for conducting electronic commerce.
- Only one in three companies with formal disaster recovery plans include multiple geographic locations in their recovery plans.
- Only 45 percent of companies have a formal disaster recovery plan in the event of a disaster.
- Only 12 percent of organizations have an effective enterprise recovery plan.
- More than one in two companies have experienced a business interruption. Although organizations with plans are no less likely to experience a disruption, they typically experience shorter disruptions than those without a plan.
- The median length of a disruption for companies with disaster recovery plans was six hours; companies without a disaster recovery plan had a median disruption length of 10 hours.

What disaster?

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a company changes technologies or updates applications, but ideally more often. The key is to have a plan that not only anticipates possible disasters, but also provides for the smooth continuation of the business.

Another key element to planning involves determining the mix between traditional "hotsite" recovery; data vaulting or electronically mirroring data at another location; drop shipping replacement equipment; and remote recovery, where a truck loaded with equipment can come to a disaster site and provide a temporary solution. "In the past — in the hotsite business — it was just an annual contract. Now, you cannot provide a contract for disaster recovery for a client and then walk away from it for six months," says Canfield-Woods.

But prioritizing data and getting the right technology and services mix is the easy part. Changing how people think about disaster or business recovery services is more difficult. "In the old days, it was all about systems recovery in the IT world. Now it's becoming more and more about strategies for staying in business no matter what happens," according to Belinda Wilson, a senior technical consultant with HP's Professional Services Organization (PSO).

The stakes can be even higher than lost revenues, Wilson notes. According to a study by the University of Texas, only 6 percent of companies suffering from a catastrophic data loss survive, while 43 percent never re-open and 51 percent close within two years.

Wilson notes another reason for the recent growth of business recovery services — deregulation. She says deregulation in industries like telecommunications and utilities means that companies not concerned about disaster recovery in the past are now spurred by competition to have a plan in place. In the United States, Digital has begun to engage in alliances with major telecom companies to provide remote backup rather than hot sites.

"The ability to occupy a hotsite is only half of the solution. Once you are in there, you are operating at less efficiency and greater cost than you were before the disaster," according to Bruce Saulnier, Americas business recovery services manager for Digital Services. "The question then becomes: How do you get back to where you came from? We are trying to keep people out of a hotsite by providing for continuous operations of mission-critical services."

"You now have competitors where there were none before," HP's Wilson

HP HA SOLUTIONS: IT'S AN UP THING

When HP introduced its pre-bundled Domain Internet Servers this past September, the technology got all the buzz. But for IS managers building e-commerce solutions and supply chain management infrastructures over the Internet, uptime rules. So, listen up. HP also introduced the HP 9000 Mission-Critical Server Suites program with High-Availability (HA) Foundation Configurations guaranteeing 99.95 percent uptime for HP Domain Business-Critical High-Availability Server Solutions. According to HP estimates, you can limit your downtime to just 4.5 hours annually. That's compared to the industry standard of 99 percent or 3.5 days. The HA Foundation Configurations are as follows:

- A High-Availability Solution Plan (HASP) up through the OS developed with implementation input from IS managers and your HP sales team.
- Two HP 9000 K460 Enterprise Servers mirrored for high availablity. D380 and T600 HA Foundation Configurations will be available in December, and two additional configurations based on the high-end V2200 and the K570 will be available in early 1998.

Additional components include HP's HA storage solutions and industry leading HA middleware, as well consultative implementation services and fast track, proactive support services based on HP's enhanced Critical Systems Support for ongoing proactive and reactive support services.

Pricing will vary depending on selected components and options as well as the number of HA Foundations in an environment. The starting list price for the initial K460 midrange HA Foundation Configuration is $650,000.

To build your HA Domain Solution, order the HP HA Foundation Configuration, appropriately sized for your business requirements, with one of the Domain Software Solution packages. For more information on the HA Foundation Configurations, go to the Mission Critical Server Suites Web site at www.hp.com/go/ha.

On the Wintel side, HP NetServers will be getting into the HP Domain HA act by mid 1998. At that time, HP will provide configurations based on two mirrored HP NetServer LH Pro, LX Pro, LXe Pro or LXr Pro servers running MSCS (formerly known as Wolfpack). Also included are industry-standard LAN connections, shared SCSI which enables servers to access storage subsystem and a "private heartbeat" line allowing the servers to communicate their status. An automatic "failover" moves applications and transfers resources within 30 seconds if one server fails; an automatic "failback" option reverts to original server once available.

says, citing studies that say customers generally accept interrupted service due to a disaster for no more than 72 hours. "In the past, though, where could you go? Today, if I have a choice and my service goes out, I may get mad and go elsewhere." The banking industry, she notes, has always been a bit of a special category because they have been required by law to have disaster recovery plans.

But HP's Cronin adds that he has seen a new twist in recent years. Many banks are beginning to require recovery plans before they grant loans to certain categories of business. The result is a growing market for complete recovery solutions, says Bob Bronner, executive vice president for SunGard Recovery Services (Wayne, Pa.), a recovery specialist that features seven HP T500s at its Chicago and Philadelphia hotsite locations. Bronner explains that SunGard also is promoting use of its disaster recovery facilities and testing centers across the country for companies who want to run Year 2000 tests on their systems

BRS is becoming a very hot topic in industries like healthcare and manufacturing, according to Stephen Higgins, marketing director of Business Recovery Services for IBM Global Services (Sterling Forest, N.Y.). "We're getting a lot of medical and healthcare firms," Higgins says. "They cannot afford to have any downtime on patient information. You also have automobile manufacturers going to just-in-time manufacturing, meaning that they are demanding that their suppliers have recovery systems so that the parts they are expecting show up on time."

IBM's BRS unit currently provides business continuity services for companies ranging from Baxter Health Care to Federal Express to Texas Instruments. One IBM BRS client Bill Douglas, senior vice president for Nation's Banc Services Inc. (Dallas, Texas), says he has seen a growing awareness of business recovery considerations outside IT departments. "As we go through and do a business impact analysis, we have the business units participate in this process,"

RECOVERING FROM A BAD DAY WITH WINDOWS NT

Although most companies today use Windows NT for basic productivity applications such as file and print sharing, database applications and e-mail, Forrester Research (Boston, Mass.) predicts the platform will move into core business applications such as data warehousing, systems management and transaction processing by 2000. A growing reliance on NT will make these challenges more apparent, particularly as those applications are entrusted to the new operating system. According to the Gartner Group, "1997 will be a pivotal year as experimentation and planning turn into true business-critical deployments of NT — some successful, some not."

With overall demand for NT increasing, there's a parallel demand for NT recovery services. Dataquest predicts that the worldwide market for Windows NT services and support will reach $12 billion in 2000. In-house IT staff members and outside suppliers of NT recovery services face a new world with NT, which is quite different from UNIX.

The challenges of recovering NT systems range from the arcane to the mundane. They include:

- General lack of in-house experience with NT
- Specifically, lack of experience loading the operating system from scratch
- Incomplete documentation of the NT installation
- Keeping up with revisions to the operating system
- Complexities of recovering mixed UNIX/NT environments

Financial services organizations, which use NT for stock trading, and manufacturing companies, which rely on it for warehouse logistics, are adopting NT more quickly than others. For these kinds of industries, recovering systems is crucial because of the high cost of downtime. Contingency Planning Research (Livingston, N.J.) says the average cost of downtime for retail brokerage operations is $6.45 million per hour. On the other hand, Find/SVP (New York, N.Y.) reports that the average financial loss per one hour of disk array downtime in a manufacturing company is less dramatic, but certainly significant, at $26,761 per hour. Across industries, the average cost per outage is $330,000. The average outage lasts four hours, and there are nine outages per year on average, according to a Find/SVP survey of 450 IT executives with Fortune 1000 companies.

As in any environment, the interruption of NT operations can occur at any time and can be caused by anything from equipment malfunctions to operator error to natural disasters. To recover, particularly if the NT or UNIX/NT environment is used for business-critical applications, requires in-depth NT knowledge and expertise, the ability to keep up with the latest NT technology and quick access to multivendor hardware.

The first of those requirements, NT knowledge and expertise, can be hard to come by in today's downsized IT organizations. Streamlined staff may simply not have the resources to keep a Windows NT environment — which is not as familiar as UNIX — up and running. Further complicating the matter, vendors often provide the operating system's initial configuration and startup as part of a turnkey solution, which means the IT staff has no experience installing or configuring NT. In addition, recovery tools and scripts that have been tried and tested for UNIX and other environments are not yet readily available for the NT operating system.

Networking technology is changing so rapidly that it is doubly hard for overextended in-house staff members to stay current on NT. And unfortunately, companies that do have the expertise often shunt those resources to projects considered "more important" than recovery. Even with NT knowledge, the in-house staff's access to the multivendor equipment potentially needed to restore a mixed environment usually is not sufficient to provide rapid recovery.

To minimize risk in case of an NT system failure, a growing number of companies are turning to third-party recovery services providers like HP, Comdisco Continuity Services (Rosemont, Ill.) and SunGard Recovery Services (Wayne, Pa.). HP offers a suite of consulting and backup services that include the local technical assistance necessary for a speedy recovery. The company's Business Recovery Program includes HP Business Recovery Planning, HP Backup and HP Backup Express. Included are services to analyze, rehearse and role-play disasters, and options for quick-shipping hardware to clients within 24 hours of a disaster. A unique relationship between HP and Microsoft keeps HP updated daily on new Windows NT software patches and revisions, ensuring access to critical information that can reduce the customer's time to recover. The relationship also gives HP direct access to Microsoft Lab, something the average company does not have through the in-house IT staff.

—Bill Cronin is marketing manager with HP's Business Recovery Services.

Douglas says. "In the old days — a year or two ago — it was only the technology folks who did this. We now ask the business units what the critical periods of time are and what the exposure to their bottom line is. Then we look at the different levels of recovery solutions that are available to them to recover within those windows."

For those not yet convinced that a business recovery plan is a necessity, Cronin offers both a carrot and a stick: "You can look at it as a competitive advantage," Cronin says. "We are doing this and our competitors are not, so who will win out when something bad happens? Some estimate that it takes $1 to service an existing customer, $7 to gain a new customer, but $50 to regain a customer that you have lost. People don't always think about what it takes to get back those you have lost. But it costs a lot."

—James Dukart is with the Washington News Bureau.

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Digital Equipment Corp.
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HP Business Recovery Services
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SunGard Recovery Services
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The Nightmare Before Christmas

It will affect you. You can't ignore it. By Christmas 1997, there will be 736 days until the Year 2000. You're nightmare is just beginning.

Only one out of every five enterprises will have addressed the Year 2000 date change by the end of 1997. And 50 percent of all companies in the world will still not be Year 2000 compliant by the end of 1999. That's what analysts at The Gartner Group (Stamford, Conn.) are predicting.

Gartner estimates also show that companies will spend between $300 and $600 billion between now and the end of the century to address date change issues. Most of that money is going to be spent within a narrow window: 1998 to 2000. Says Kevin Schick, analyst for the Gartner Group, "Many companies are still in a stage of 'denial' and do not want to commit major resources to a problem as large as this."

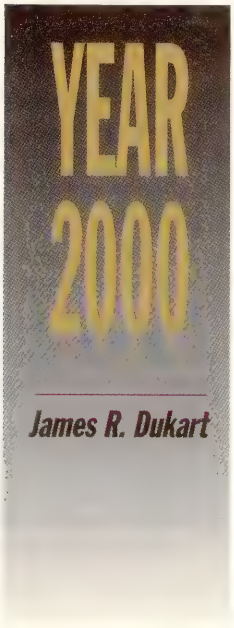
Using Gartner's oft-cited figure of $1.10 per line of code to find and fix date calculation errors, a company with a medium-sized inventory of 8,000 programs — each averaging 1,500 lines of code — has more than 10 million lines of code to review. A $10 million dollar review and repair bill for Year 2000 date changes may not be out of the question for such a firm.

Tricks Of The Y2K Trade

There are essentially three basic strategies companies can use to address date code changes:

Rework Existing Systems. Usually this involves dedicating considerable staff and management resources to seeking out, changing and testing code. This approach takes advantage of existing programs, but may turn out to be very costly in terms of the time and the programming expertise needed to do the work. In addition, because there is still a great deal of basic code written in languages such as COBOL, it may get increasingly difficult to locate, train and retain anyone with enough COBOL expertise to be effective at ferreting out date codes in legacy systems.

Replace Systems. Unfortunately, this may not be a completely successful end run around the costs of reworking systems, because replacement implies systems migration, which requires talented and experienced programmers and testers savvy on both the new systems a company is deploying as well as the older systems from which a company is migrating.



Outsource Date Changes. Outsourcing firms will be similarly hard pressed to come up with the resources needed to effectively meet the demands of businesses over the next two years. Outsourcing also means that companies are entrusting systems to those people outside the enterprise. With cycle timeframes growing increasingly short, some companies may be weary of handing the reigns of critical business processes to outsiders. This is hardly a "magic bullet" strategy either.

Keep The Lights On

Wisconsin Power & Light (WP&L; Madison, Wisc.), a natural gas, water and electricity utility in south and central Wisconsin, was prompted by upcoming Year 2000 concerns to migrate its Customer Information System (CIS) from legacy mainframes to open systems on Year 2000-ready software. The utility worked with HP's hardware division and Performance Center (Dallas,

Texas) to test changes before it went live, and used the services of HP Cure2000 partners I-Cube for legacy migration and development and Cambridge Technology Partners (Cambridge, Mass.) for consultancy and executive and management education.

WP&L's initial objective of Year 2000 compliance was achieved early on, according to CIS Director Linda Taplin-Canto. But expectations have been exceeded by other gains, including a new, flexible open system; a growth path that includes possible customer interaction over the Internet; and new billing services that are particularly attractive to some WP&L's biggest energy customers.

Companies will spend between $300 and $600 billion between now and the end of the century to address date change issues.

Perhaps the best way to get going on the Year 2000 issue is to view it as an opportunity to do things you might have wanted or needed to do anyway. Many organizations spend as much as 70 percent of their IT man hours updating and maintaining legacy systems.

And legacy applications don't offer much in quick enhancement flexibility. "Realistically, if you have mission-critical applications that are not in place by the Year 2000, they had better be fixed soon, or the business is out of business," sums up Gartner's Matt Hotle. "The time to act is now, and it's been now for some time."

—James Dukart is with the Washington News Bureau.

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Case Study Solutions

Co-Creating A Data Management Solution

GTE Government Systems Launches PDM System In Comprehensive Re-Engineering Effort

"We have a commitment to our customers to provide quality systems with time to market at the lowest possible cost," says Charlie Ross, project manager for information technology at GTE Government Systems Corp. (GSC; Needham Heights, Mass.). So, GSC, a part of GTE, the largest U.S.-based local telephone company and the leading U.S. cellular service provider, began a product data management (PDM) process that dramatically altered the way GSC managed internal information.

For the uninitiated, PDM is a tool for managing engineering data, allowing businesses to control costs, enhance internal communication, minimize errors and be more responsive to customers. "GSC also has an internal commitment to communicate research and development information across the company. The integration of a top-of-the-line PDM system allows us to address both commitments at the same time," says Ross.

ADDRESSING MULTIPLE GOALS

GSC had to address two immediate business needs: reducing IT costs and re-engineering the control and distribution of CAD data. "We wanted to move to a more cost-effective technology, and at the same time to standardize our database infrastructure. To do that, we needed to move our product data from the mainframe and integrate more tightly with CAD and imaging."

So, the mainframe was decommissioned and migrated to a UNIX client-server technology to achieve the significant cost reductions. At the same time, Ross and his team looked for a PDM product that would meet both the manufacturing and engineering needs.

Because GSC creates highly sophisticated systems using new designs, data from their existing systems and off-the-shelf products, Ross explains that customization is "key to each of our customer applications. We can produce highly complex systems that will fit a specific need." So, CoCreate Precision Engineering WorkManager PDM software was chosen on the basis of vendor reputation and product flexibility.

GTE Government Systems Corp. is a leader in telecommunications, information and intelligence systems, electronic defense systems and systems integration for defense, civilian and commercial markets in the United States and abroad.

TRACKING THE DATA

CoCreate WorkManager is based on a straightforward process. It keeps data secure in an electronic "vault," and puts references to data into an online "packet" for routing to various team members for design, analysis and final approval during product development. Then, it releases the latest data back to the vault.

The vault, an electronic depository, facilitates sharing of data from previous designs as

product development teams launch new projects.

There's now a smoother flow of information among engineers enhancing design, procurement and production. To that end, the CoCreate WorkManager installation at GSC has two "personalities": CAD Data Control and Engineering Data Control (EDC) that share a common database. As the system is further integrated, these two personalities will be merged into one, which will be accessible across all GSC locations. GSC employs 7,000 people, 2,655 of whom are engineers and scientists, at more than two dozen principal facilities and field offices around the country.

Already, EDC has slashed the number of user screens from 70 to about 25. "That simplifies our process," says Michael Cooper, a PDM engineering manager. "Engineering Data Control was the replacement for the mainframe meta data system. We have added enhancements, like being able to print bills of material from the desktop. Having these functions available is essential now that we are putting actual drawings online."

In June 1996, GSC's Mountain View, Calif. division loaded electronic images of its active drawings into a WorkManager-controlled repository. This allowed the division to shut down its aperture-card-based print facility. "Our new Technical Data Center uses 75 percent less space," says Cooper. "We're accruing significant savings. We'll be implementing a similar system for two more divisions. [And throughout] 1997, we'll phase in fully-electronic document distribution to the desktop."

On the CAD side, a main goal was to standardize how data was passed from one person to another. Cooper recalls piles of paper — memos, distribution lists, sign-off sheets — used to control data "the old way." "When a designer had a file that was ready to be worked on, notification was usually made with a phone call," he says. "Occasionally, the wrong file wound up on the factory floor.

"Now," he says, "our CAD data control system has a management system built in. It provides a simple, high-quality release system and approval cycle. That has saved an enormous amount of time for the tracking, storage and retrieval of files. The hardware design process is entirely integrated, from the electrical design environment to the manufacturing side."

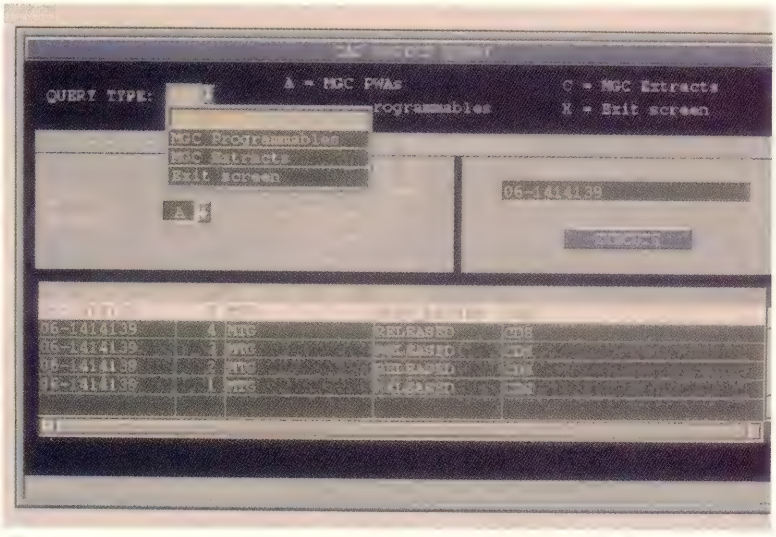
AUTOMATIC INTEGRITY

A user submits a design/manufacturing data package by creating a packet, which houses all project designs and documents. The packet is routed electronically to a manager's online "in basket" for approval. "Previously, if an engineer wanted to create a snapshot of a 200MB CAD database for routing, we had to contact electrical CAD support experts," says Ross. "They had a 48-step manual process that would take three or four hours to get through, all to give the equivalent level of integrity that we have built into our current system."

Now, when a design is ready for release, the user can initiate automated quality checks and release the design through the CoCreate WorkManager system. The entire process takes less than an hour, with a minimum of human intervention (about five or 10 minutes). Once the design is released, it is routed to a lead project engineer for approval. An e-mail message is sent out to interested parties, including operations people who will make use of the data for manufacturing.

Because all engineering data is stored in one location, it becomes a simple matter for engineers to locate and retrieve existing data for revisions or the development of new projects. "This ability to retrieve existing data gives us greater consistency and accuracy in the structure of the data and in the resulting product," says Ross.

"At the back end, we can create an archival tape directly from the PDM," says Ross. "We built a screen that shows everything that has been released since the last archive. The administrator can choose what he wants to archive and make a tape. Before, an administrator would come in once a month and spend six or seven hours pulling designs from all over the network to create a tape. Now it takes about 45 minutes."



Engineers at GTE Government Systems Corp. use CoCreate Precision Engineering WorkManager PDM software to query for CAD data that will allow them to rebuild a file or develop a new project.

The new PDM system is already making a significant contribution to the company's ability to respond to a competitive commercial environment. "It helps us with time to market, because it provides a faster, higher-quality method of designing and retrieving existing data for reuse," says Ross. "As a leader in the industry we are always striving to provide our customers with the best possible product. That means streamlining our processes and maintaining our product integrity."

CoCreate Software Inc. can be reached at 3801 Automation Way, Fort Collins, CO 80528; (970) 206-8000; www.cocreate.com.

Fred Mallett

My Disk Runneth Over

I once spent an evening in a crowded bar with a beer drinker (let's call him Spunky) whose consumption was limited only by how fast the server could deliver beers. On the other end of the beer drinking spectrum, it takes me quite a while to finish just one, so delivery time doesn't matter.

Later that night, Spunky got smart. He called over another server and ordered a beer. He then had two servers providing a delivery throughput closer to his consumption ability. I didn't need the advantage of a second delivery system, as the delivery was already faster than consumption.

What does drinking beer have to do with computers? More than you think, if you think of beer as data, and of the service people as the I/O system. Then, think of the consumers (Spunky and myself) as the systems.

Here's the point: it's a tremendous waste to have a system that can process data faster than the I/O system can deliver it. On the other hand, if you are limited by the system speed (my slow sipping) and memory (remember, it was beer), a faster I/O system will do you no good. That night, Spunky did some I/O system enhancing (the second server), and was able to increase total system throughput. But I hope he took a taxi home.

The analogy itself, however, demonstrates a sobering disk I/O system performance issue which can be broadly summarized into two categories: data access speed and efficiency of utilization.

Data transfer speed can be looked at in two ways: system total and per process rates. For workstations, the per process rate is more important than the system total, as they typically are trying to accomplish a single task as quickly as possible. Think of Spunky. For a multiuser system used for various purposes, with many different tasks all needing to be done quickly, system total is more important. Luckily, enhancing one usually enhances the other.

However, there are some exceptions. A good example is the disk buffer cache. The disk buffer is an area of memory set aside to store recently accessed data in the hope that it will be needed again soon. In the case of a system that is accessing large amounts of data to perform large computing tasks, the disk buffer is not very important. Data is not accessed repeatedly very often.

With this type of system usage, that memory might be better used for normal paging. On the other hand, a system that is used by many people performing similar tasks (data entry and software development come to mind), data, like programs, is often used over and over. Therefore, a large disk buffer cache amount might save many disk accesses. Luckily, when you go to HP-UX 10.x, the disk buffer is dynamically sized, so we don't need to deal with it as much.

If you do, the minimum and maximum sizes of the disk buffer can be adjusted with kernel tuning parameters.

By far, the biggest effect on I/O throughput is the hardware. Disks, controllers, drivers and the system I/O bus vary greatly in performance. There is no reason to have disks that can deliver twice as much data as the system bus can move it. Newer HP boxes have very fast I/O buses, so it makes sense to get the data to the bus as fast as possible.

Many of the older systems will show no system throughput increase with today's faster disks, as a single disk can overload the bus. Assuming that the system can handle the data, faster disks using multiple controllers can really increase data access speeds. Multiple I/O buses can make things even faster.

For example, let's assume an older machine, with three disks on one SCSI daisy chain. At first, it might seem that if we put three controllers in the system (if it can support it), then one disk per controller speed would be higher. It probably would, but not by much.

If this was a newer system with the newer faster buses, we would have seen a great increase in data access rates. Be sure to match disk speed to controller speed to bus speed. If a controller can only handle 5MBps, and the disks can send 6MBps, you would be better off with one controller per disk. But if the system bus was not much faster than the controller transfer rate, there is not much sense in having multiple controllers.

If you have three disks on one controller, each with 4MBps rates, and the controller can only do 5MBps, you would be better off buying a 20MBps controller than two more 4MBps controllers (or a faster system with faster controllers, if that system cannot have the SCSI controller upgraded).

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Bottom line: Before you spend money, be sure all components are matched in speed, that the system bus can handle the controller speeds, and that the controllers can handle the disk speeds.

iostat: A BALANCING ACT

If we put money aside, an important consideration is disk I/O system balancing. This covers many issues, among the biggest are data distribution and disk block sizes. Data distribution means attempting to balance the load among the systems disks and disk controllers. In order to do this, you need to see what the transfer rates are per disk and per controller.

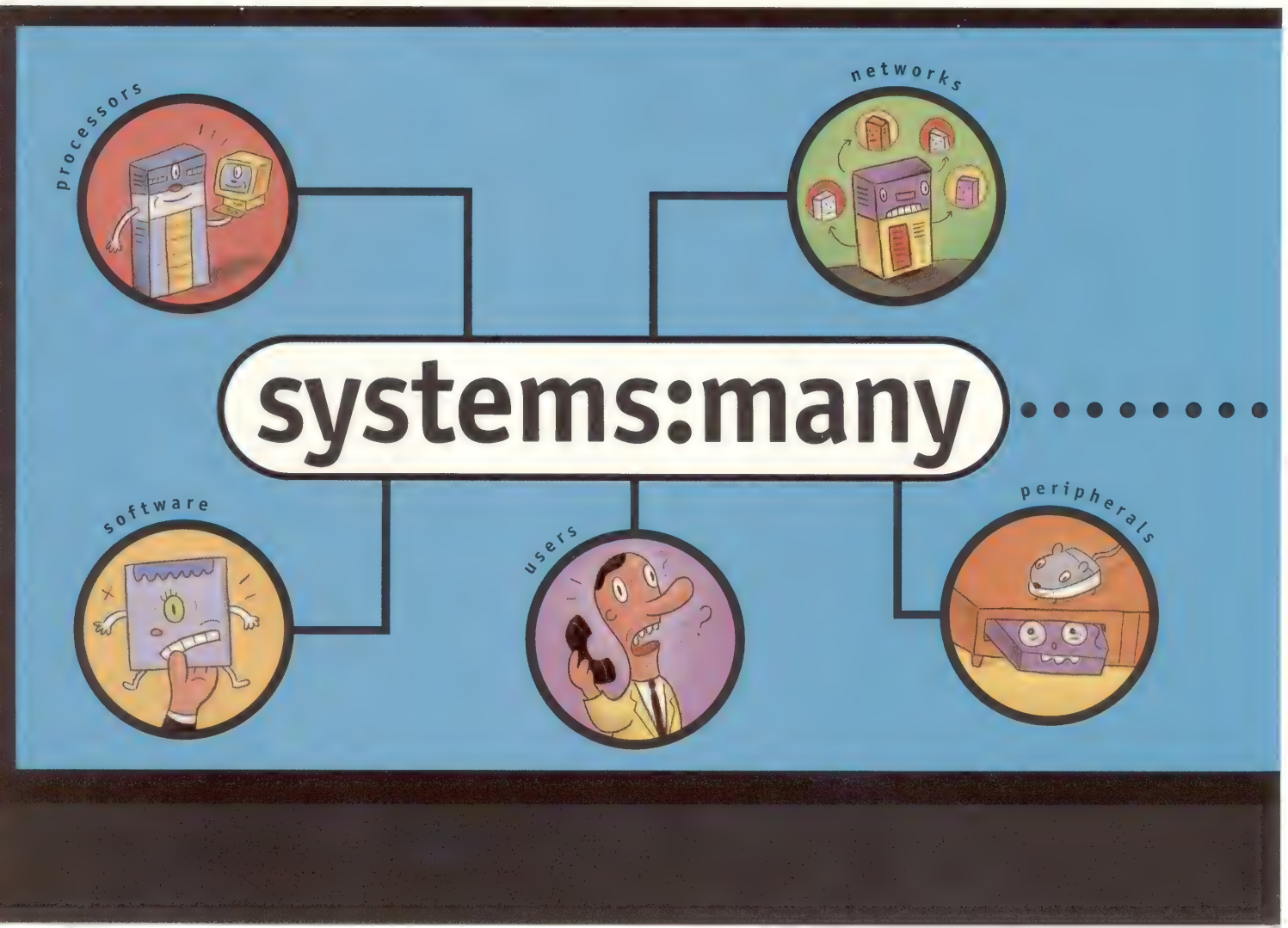
This is easily accomplished with the **iostat** command. It reports disk transfer rates for all disks on the system (by default) in kilobytes per second. You should specify a repeat interval, thus using it to gather data over longer periods of time to get an idea of the rates of use. Add up the rates of all disks on each controller to see the total for the controller. If you find that one disk is used very heavily and another is seldom accessed, you might consider moving some data or executables to the lightly used disk to balance the load.

For workstations, the per process rate is more important. For a multiuser system, system total is more important. Luckily, enhancing one usually enhances the other.

This is especially important if they are on different controllers. You can usually guess what will be accessed the most. If most users of a system are developing code, they will probably use system executables often. If your users run large engineering applications, the system files will not be hit that often, but the data and application executables will be accessed very often and **//tmp** might be used heavily. If you can, try to spread the load across the I/O system by choosing where you physically locate data.

An often misused item is the minfree amount of a disk. This can be set when the file system is created or by using the **tunefs** command later. The default is that 10 percent of the disk must remain free, non-root users will be told the disk is full when there is still 10 percent unused. The reason for this space is to allow the system to attempt to keep large contiguous areas of the disk free for use when it needs to write large data chunks.

If you drop this amount too low,



you stand a very good chance of slowing disk throughput dramatically by causing fragmentation of data. With today's larger disks, 10 percent might seem a bit excessive if you use the whole disk for one file system.

That could be true, but why would you create a file system that large unless it was to contain very large files? Large files will need large amounts of free space to keep from becoming fragmented. In other works, for best performance, leave the minfree amount set to 10 percent.

Using large block sizes allows for higher data transfer rates, but only when large amounts of data are requested at once. This occurs when applications access large data files sequentially. You can read a large file faster if the disk uses large blocks. This also can cause poor disk utilization if you have many small files.

Small block sizes allow for faster access to smaller amounts of data, such as when applications access lots of little files, like in program development or general user access. Small block sizes are more efficient in disk utilization.

HP-UX allows fragments to be assigned, thus gaining better utilization, but with good throughput for larger files. It is a good compromise, but takes some time for the system to figure out where to put the fragments. For best total speed at the expense of efficiency of utilization, don't use fragments.

Be sure to use separate file systems with appropriate block and fragment sizes for different types of data access. Data accessed a small amount at a time, such as files read by an editor, should be on a file system with small blocks.

Large files read sequentially, such as by an engineering application that number crunches multimegabyte files for hours, should be on a file system with large block sizes. That is for efficiency of disk space utilization and improved speed. For total speed optimization, they should be on different disks and, better still, on different controllers.

A book or a class on performance would be a good idea if you are really interested in optimizing your configuration. There are many issues not even discussed here, like disk striping, using the **sar** command to track disk information over time, **inodes** count and several other issues that I am sure astute readers will point out to me.

Considering the size of the e-mail files I expect to get pointing out the errors of my judgment, I am off to create a new filesystem with large block sizes.

-Tap into Fred's new filesystem by sending your e-mails to frederm@famece.com.

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Ryan Maley

perfmon: An NT Traffic Report

"It's 5 o'clock and traffic seems to be inching along on the CPU highway. There's already a 6MB backup and no relief in sight. But, the proposed memory expansion should help alleviate this bottleneck in the future. This report was brought to you by perfmon — a utility to monitor the use of system resources via a graphical interface."

Performance Monitor, or **perfmon**, is part of the Windows NT OS and is the primary tool to locate performance bottlenecks, benchmark system performance and identify the need for more resources, such as memory.

Performance Monitor can be run from the Administrative Tools program group. As Performance Monitor collects data about your system, it can display charts, build log files, generate reports and even send alerts.

Perfmon collects information about various hardware and software components called objects. Various measurements called counters apply to each object. Each counter can track several instances. For example, the Processor Object has counters such as Percent Processor Time and Interrupts Per Second. On a multiprocessor system, each counter can be measured separately.

ALL ALONG THE WATCH TOWER

Perfmon can watch counters on the local computer where it is running, as well as on remote computers. Applications such as Exchange Server and Internet Information Server add their own set of objects to allow monitoring. Perfmon tracks data in four ways: through charts, logs, reports and alerts. Charts display a visual graph of the counters on your screen. Logs contain a sequential log of activity measurements. Reports generate a summary listing of activity. Alerts watch for specific events and log the event or launch a program (*see* "Answering Your Page").

Discussing all the counters you can measure with perfmon would take quite a while, so we'll discuss a few to acquiant you with perfmon's capabilities.

The memory on your computer is measured with the Memory Object. One of the most important memory counters is pages per second. If you are worried about low memory, watch this measure. It tracks the number of pages read and written to the virtual memory paging file on your hard disk. Page faults per second measures the number of times a virtual memory page is not in main memory.

The disk drive subsystem is measured with the LogicalDisk and PhysicalDisk objects. Both perform similar functions, but LogicalDisk makes it easier to track individual drives configured with multiple partitions. Disk performance counters are not enabled by default in NT.

To enable the counters, type **diskperf -y** at the command prompt. The counters take effect after the next reboot. If you use stripe sets, **diskperf -ye** will enable counters on individual drives within a stripe set. Type **diskperf -n** to turn the counters off. Some of the disk counters are:

Avg. Disk Queue Length
This counter measures the average number of read and write requests that were queued for the disk. This is an indicator that a disk is not keeping up with demand.

Disk Transfers/Sec
This is a measure of the read and write operations on the disk. If this counter approaches the disk specifications of the vendor, you are nearing the capacity of the drive.

% Free Space
This measure can be used to indicate when disk space is low and is good for capacity planning.

% Disk Time
This counter measures the amount of time the disk is busy servicing read or write requests. Percentages over 90 indicate a very busy disk. A High % Disk Time number may not indicate a disk problem. Excessive memory paging will

Perfmon collects information about various hardware and software components, and displays it via charts, log files, reports and alerts.

ANSWERING YOUR PAGE

In addition to passively monitoring the performance of your system, perfmon can be used to alert system administrators and support personnel about problems. Perfmon alerts can be configured to watch until a particular counter drops below a certain point or rises above some point, and then to run a program.

Here's an example: you never know that you need to reset a router until a bunch of angry users start complaining that they can't send. So, configure an alert to watch the MSExchange IMC object counter Queued Outbound. When the counter goes above 20, launch a command script to send e-mail to your pager. You can then take action to reset your router, perhaps before users start complaining.

How do you send e-mail to your pager? First, you'll need a command line e-mail program for NT. I recommend the freeware program Blat. It's simple to use: **blat [filename] [e-mail address]**. And it's a free, public domain utility. However, your paging service must support e-mail. If you are using PageNet or SkyTel alphanumeric pagers, you're good to go.

Each service allows users to send messages to pagers numbers at their domain. Usually this is some combination of the pager number, PIN and domain name. For instance, your PageNet pager number might be (800) 555-1234 and PIN is 99999. Sending e-mail to 8005551234.99999@pagenet.net delivers the message to your pager. See the following homepages for more details:
gepasi.dbs.aber.ac.uk/softw/blat.html
www.pagenet.com
www.skytel.com

cause lots of disk activity, but the real problem is in amount of RAM on the system. If the only indicator of disk subsystem problems is high **% Disk Time** counts, be sure to check the counter pages per second of the Memory Object to see if memory paging is the problem.

THE PROCESS OF PROCESS

The Process Object counters allow a variety of measurements of individual processes. Each running process in NT has its own instance so if you suspect a particular application of misbehavior, it can be watched.
Some important Process counters are:

% Processor Time
This is how much all of the threads of the process used to execute instructions.
Priority Base
The thread of each process can raise or lower their own priority relative to the priority base. By default, some processes may set their priority higher than system administrators would like. Track these processes with the Priority Base counter.
Page File Bytes
This measures the number of pages allocated to the process. All processes share a common page file. If a particular process is greedy, it may prevent other processes from allocating memory. The Page File Bytes Peak counter measures the highest number of bytes the process allocated.

These are just of few of the objects that are counters. Because nearly every facet of your system and software can be measured, perfmon is a great tool that can make systems management and planning much easier.

—What topics would you like monitored? Let Ryan know at ryan@maley.org.

Mark McFadden

New Impressions On Compression

Until everyone can dial-up their Internet provider and rocket around the Internet, Web designers will always face a dilemma: Should their pages incorporate rich graphics and sophisticated design or is it better to resist, knowing that the browser's STOP button is only a mouse click away? Even at the racy speeds provided by 56.6k modems, downloading a JPEG vista of the Martian landscape can take forever. Imagine the wait if you downloaded an image that had the richness and detail of a photographic print.

If photographs are to be displayed over the Internet, new compression and transport techniques are needed. Today's image file formats, notably GIF and JPEG, were never intended to handle photographic images. The simplicity of the existing formats also are a drawback; a browser can do little more with an image than to display it or save it to a disk. Any new strategy for transmitting photographic images over the Internet must overcome these key performance and functional hurdles. HP, along with Microsoft, Kodak and others think they have found a new Internet imaging strategy.

Storing an image in multiple resolutions allows a server to provide differential access to images based on business requirements. A company could choose to make low resolution pictures available to viewers outside their intranet while retaining the high-resolution images for local clients. In another business model, a low-resolution picture could be provided as a teaser for a pay-per-access high-resolution photograph. The format also provides a new measure of security for images. Because each image is divided into individually addressable tiles, security rules can apply to any individual or group of tiles.

The new approach is based on replacing traditional methods of encoding images with a new file format called FlashPix. Instead of being a simplistic, one-time encoding of a picture, the FlashPix format is made up of a pyramid of images, each at a slightly higher resolution than the previous one. Each of the layers is also divided into square regions, called "tiles," of 64 by 64 pixels. Applications that are FlashPix-aware can request and read individual tiles, a group of tiles or the entire image. Browsers can ask to only see the tiles necessary at the required resolution; just as you don't need the entire contents of the kitchen for an afternoon picnic.

Most browsers can't interactively choose a region of an image and ask that it be transmitted at a particular resolution. To take advantage of the FlashPix format, Internet users need a new protocol for requesting information about images and making requests of FlashPix compliant servers. With this in mind HP, together with Kodak and Live Picture Inc. (Scotts Valley, Calif.) have proposed the — you guessed it — Internet Imaging Protocol (IIP).

The new protocol allows a Web client to request basic information about a FlashPix image. A collection of standard designators, called "basic-object-labels," can be used by the browser to request information about the image. Some of the standard properties saved in the image include the height and width of the image, the size and number of tiles, the number of resolutions available, and color, scaling and contrast details. The protocol also allows a client to make requests for specific tiles at particular resolutions.

FlashPix is made up of a pyramid of images, each at a slightly higher resolution.

The developers of the FlashPix format have anticipated the need to retrofit the two industry leading browsers for the new format. A plug-in (available at www.livepicture.com/html/viewers.html) provides interim support for the new format for Netscape Navigator and Microsoft Internet Explorer users. The plug-in has two styles of operation. In embedded mode, a user sees traditional rectangular images on Web pages. However, when a user clicks on these images, a menu appears that allows the user to print, zoom, pan or return to the original image. The printing and viewing options take advantage of the Internet

Imaging Protocol to request additional image data, as needed, from the FlashPix-aware server. In "full" mode, the image takes over the browser window and a toolbar appears at the top of the screen. Full mode adds additional functionality, including the ability to crop and rotate the image.

For any of this to work, of course, the server must understand the http-based Internet Imaging Protocol requests. There are currently two server modules: a Netscape API module and a more general, but slower, CGI module. Each of the modules allows any FlashPix-aware client to access the new pictures from the Web and display and manipulate the resulting image. It would seem that FlashPix promises a new era for high-quality imaging on the Internet.

Software that works with the FlashPix format is already available and HP has made the format and the new Internet Imaging Protocol a cornerstone of its initiative to re-architect how pictures and images are manipulated on the Web. With support for the initiative coming from Microsoft and Netscape, Web designers may soon have a new strategy for images that provides new functions and better performance without needing to be a compression expert.

—What impressions would you like to leave? Let Mark know at mcfadden@21st-century-texts.com.

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Extending Storage Beyond The Enterprise

ROGER ARCHIBALD

The trends in the enterprise storage market are being driven by three intersecting needs: the need for data warehousing, the need for employees to share mission critical network applications and the need for competitive advantages. Whether you're a manufacturer wanting to minimize inventory and move the product through the distribution chain efficiently, or a service company looking to improve customer response time, success depends on information management. This information must be highly accessible. And because it's critical to running the business, it must be backed up and protected. Extended storage — storage beyond the desktop — is the key to handling this increase in information storage.

The extended storage market can be divided into two segments: archiving and distribution in one, and backup and disaster recovery in the other. Near-online archiving for quick access to information, that is not used day-to-day, is a competitive advantage. With connectivity exploding, more and more data must be available quickly to users over the network. At the desktop, near-online storage and data distribution will primarily be provided by CD and DVD devices.

The CD will continue to be the most popular optical storage device. Its almost universal format, compact size and 650MB capacity makes it a favorite for extended storage and data distribution tasks. CD-ROM readers are available everywhere, making the media ideal for distributing information, creating reference libraries and storing multimedia sales presentations. When traveling, you can be confident that your presentation can be run at the site: if there's a CD-ROM drive available, it's compatible.

The new CD-RW drives provide an easy-to-use methodology for creating CD-ROM disks at the desktop. These drives can record either CD-R (Write once) or CD-Rewritable media. CD-R is ideal for audit trail applications or to safely archive files for permanent long-term storage. The CD-R disk can be read on any CD-ROM reader. CD-R media (around $6 per disk) is an economical alternative to optical WORM for sites with smaller storage needs.

Zev Rattet does contract software development which involves the creating of thousands of lines of code. He was worried about what he calls "the black hole" in his file protection scheme. Although work-in-progress and completed projects are placed on magnetic disk, there is no permanent protection against accidental or malicious erasure. To ease his mind, Rattet added a foolproof level of long-term data storage to his small, three-station PC network. He installed an HP SureStore CD Writer.

That was 10 months ago, and he did it just in time. "The SureStore CD Writer came to the rescue

```
corp:/acctg >ls general.ledger
UX:ls: ERROR: Cannot access general.ledger:
No such file or directory

corp:/acctg >ls payroll.1qtr
UX:ls: ERROR: Cannot access payroll.1qtr:
No such file or directory

corp:/mfg >ls inventory.cont
UX:ls: ERROR: Cannot access inventory.cont:
No such file or directory

corp:/mfg >ls order.entry
UX:ls: ERROR: Cannot access order.entry:
No such file or directory
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CIRCLE 408 ON READER CARD

when we had a customer who somehow lost all the 'old' code. When we went to retrieve it, it was gone from our disk files as well. Luckily, we were able to recoup from the CD-R. Otherwise, we would have been out years of work," remembers Rattet. For applications requiring the revising, rewriting or erasing of stored files, the new CD-RW media is a promising future replacement for removable magnetic media. CD-RW media can be used for standard data archiving chores and as economical daily backup for large networks.

CD-RW is easy to use because it does not require any pre-writes. Users can transparently write to the CD by dragging and dropping within a number of the most popular application programs. While older CD-ROM readers cannot read a CD-RW disk, all CD-RW drives (and DVD players) are able to read CD-ROM-, CD-R- and CD-RW-created disks.

See Clearly With Optical Storage

Network archiving chores will depend on WORM and rewritable optical jukeboxes. The driving demand here is "How do I protect remote server data?" The expanding use of optical jukeboxes is being pushed by businesses' need for both near-online protected access to archived files and the ever increasing size of the network backup chore.

Optical media choices include WORM or rewritable magneto-optical disks in a variety of sizes, the most popular being 5.25- and 12-inch. Optical disks provide from 2.6GB to 10GB per platter of storage capacity. Jukeboxes, like the HP SureStore 600fx, hold up to 618GB of data all near-online. Access times and data transfer rates are approaching that of magnetic disks.

Berding & Weil, a law firm with offices in five California cities, installed an optical jukebox on its 140-node PC-WAN at its Alamo, Calif. headquarters to act as a centralized repository for every document within the law firm. The HP 20XT SureStore Optical Jukebox holds up to 20GB of information, all of which is accessible within a few seconds. The law firm is using optical read/write (erasable) disks; the jukebox also is capable of handling WORM media. They no longer have to sometimes tell clients "we can't find your file." Alfred D. McKelvy Jr., the firm's CFO says, "The optical disks are a stable media and the jukebox gives us surprising access speed. It is faster than we anticipated, faster than CDs or tape."

Tale Of The Tape

In the backup and disaster recovery segment, network and high-end system users relying on larger files to be recorded and accessible in less time are best served by DLT and DAT/DDS-3 tape technologies combined with robotics for unattended backup in a minimum time frame. The new DLT and DAT devices are capable of storing up to 70GB and 24GB per tape cartridge, respectively. Tape libraries like the HP SureStore DLT Library and SureStore DAT24 Library can hold up to 3.4TB and 144GB of compressed data with transfer rates of up to 5MBps and 2MBps, respectively.

For desktop recovery, Travan tape is shaping up as the number one media, as it keeps pace with the rising storage capacity of PC hard disks. Travan-class tape media is aimed at smaller sites where up to 5GB of backup and archiving capacity is enough to meet their needs. The Family Practice Ingrid Rule Clinic (Loveland, Colo.) is an example of a typical small-system user who has successfully implemented Travan Tape as their backup and disaster recovery storage solution. The clinic's staff of six rely on a small six-station office PC-LAN to run their busy facility and maintain records on approximately 5,000 patients. Walter "Doc" Rayburn, the social worker at the clinic, notes, "We needed something to maintain accurate backup files when the server's disk crashed, as it had done on two previous occasions — each time keeping us down for over a week until we could reload the system. So, about four months ago, an HP SureStore T4i Travan-class tape unit was installed to provide server data backup and disaster recovery capability."

The 5.25-inch half-height, SCSI-compatible tape device solved the problem of not having a full-network file backup protection capability. Soon after the HP SureStore T4i was installed, the system experienced another disk crash. But this time, thanks to the full 1.2GB daily backups performed by the staff, they were back online within 20 minutes, according to Rayburn. "Having all the data recovery files on one tape cartridge really made coming back up easy," he says.

Because of tape's proven reliability, it is the first choice of most IS professionals for long-term full data backup and archiving when quick access to the stored data is not crucial. DLT and DAT tape devices have the capacity and data throughput speed to provide data warehousing and archiving applications for very large networks, and are excellent for storing daily, weekly and monthly backups, as well as disaster recovery file copies.

Tape storage will retain its number one standing as the data backup and file archiving storage option of choice as capacity and throughput increases keep it up with users' storage needs — all at a low cost when compared to alternative media. The trend to integrate these various extended storage options within a hierarchical storage management (HSM) environment, producing a seamless, user-transparent union of all network storage devices, will continue. With this accomplished, all company data (current, archived and backup) is user accessible via near-online and offline storage vaults.

According to IDC, the worldwide market for extended storage products is expected to grow from $18.4 billion in 1996 to $25.6 billion by next year. The largest growth is expected to come from removable storage products, like optical disks and magnetic tape. A balance between the continual expandsion of a server's magnetic disk capacity and extending storage outward is needed. This balance can be achieved by augmenting hard disk magnetic storage with optical jukeboxes, CDs, DVD and tape storage products.

—Roger Archibald is marketing manager at HP's Information Storage Group.


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They Don't Call It A Brave New World For Nothing

System administrators quickly discover that mainframe-class management tools are missing in the client-server and intranet environments. Furthermore, the distributed nature and sheer number of Windows NT servers makes the management tasks that were routine out in mainframe environments much harder. This is especially true in the case of distributed databases, networks and storage resources such as disks, arrays, tape and optical media, removable drives and robotic libraries. Windows NT system administrators lack the tools to view and manage their networked storage resources. Data is not highly available, and mission-critical Windows NT servers and workstations are subject to downtime and data loss.

Storage Resource Management

Developers and users of business-critical Windows NT applications (for example, Microsoft Exchange, Lotus Domino/Notes, SAP R/3 and so on.) and large-scale Microsoft SQL Server databases are now asking for tools to monitor, manage and track the networked storage resources that store their data. So, a new category of management applications called Storage Resource Management (SRM) has recently emerged to address these problems. SRM applications monitor and manage storage resources across networks to insure data availability. SRM tools manage physical properties of storage resources such as health, capacity, performance, configuration and utilization. Michael Petersen, president of Strategic Research, an industry consulting firm specializing in networked storage, says that "SRM is to physical storage resources what network management is to routers and hubs, and what systems management is to CPUs."

SRM tools and technologies facilitate the adoption of Microsoft SQL Server and Windows NT as mission-critical platforms in the following ways: increasing data availability; ensuring that mission-critical servers and workstations are not brought down by failed or fully utilized disks; facilitating large-scale storage capacity, by managing multiple, multiterabyte tape and optical libraries; reducing total cost of ownership (TCO) by enabling large tape, optical and CD libraries to be shared by multiple applications, thereby amortizing capital costs of automation solutions; lowering administrative costs by giving administrators a common interface to manage all types of networked storage resources in a standard way.

TOM ROSE

The Role Of NT Media Services

Windows NT Media Services (NTMS) is a new Storage Resource Management standard that will be built into a future release of Windows NT Server and Windows NT Workstation. NTMS will enrich Windows NT with a native set of tools for end users, software developers and library/drive manufacturers for the main purpose of increasing data availability. NTMS is being developed for Microsoft by

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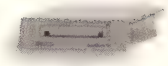

T4i

DAT24x6e

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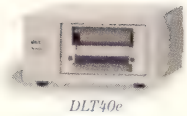

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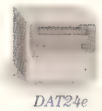

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HighGround Systems, a leader in the emerging SRM category. In September 1996, HighGround and Microsoft signed the development, marketing and technology agreement that paved the way for this important new industry standard.

A Triple Play

The NTMS storage standard is made up of three components: a graphical management tool, a Software Developer's Kit (SDK) and a Device Driver Kit (DDK). A graphical management tool, implemented as a Microsoft Management Console Snap-In, will be included as part of Windows NT Server and Windows NT Workstation.

The NTMS management tool will allow system administrators to manage media, drives and robotic libraries from any vendor in a standard way, and will support:

- Library inventories
- Media inject and eject
- Media allocate and deallocate
- Media mount and dismount
- Media pool management
- Online and offline media tracking

The SDK provides ISVs with a standard way to integrate their data management (for instance, backup/recovery, disaster recovery, hierarchical storage management, archive, document management and imaging) applications with removable media, drives and robotic libraries.

The DDK provides library/drive manufacturers with a standard way to integrate their drives and libraries into Windows NT so they can be shared by multiple data management and storage resource management applications. NTMS will benefit end users, developers and library/drive manufacturers. End users, especially system administrators, will enjoy a lower TCO of storage, greater availability and administration of data, and freedom to select storage resources.

NTMS will enable multiple data management applications (backup/recovery, document management etc.) to share the same drive or robotic library. As a result, end users will be able to cost-justify the use of automation in Windows NT environments by amortizing the library's capital cost across multiple applications.

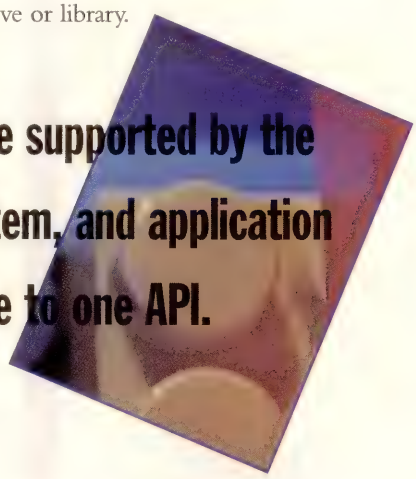
Large tape and optical robotic libraries have been used in mainframe environments for many years to ensure data availability by automating storage management tasks like drive cleaning, media labeling, media rotation and media tracking. NTMS will give Windows NT built-in support for these heavy iron libraries. The management tool will provide system administrators with a media- and device-independent way to control the media, drives and robotic libraries attached to a Windows NT Server or NT Workstation.

Driving Into The OS

Those who are contemplating the purchase of a new backup or document imaging application must first verify that the application they want supports the drives and libraries they have. NTMS will allow them to use the storage resources that best fit their needs, because all drives and libraries will eventually be supported as part of the operating system.

In the past, developers had to bear the burden of providing proprietary media management and device integration. Backup application vendors were forced to write and test hundreds of device drivers, build their own media managers and pay the price of device testing. With NTMS, devices will be supported by the Windows NT operating system, and application developers will write to one API.

In the past, when higher capacity, higher performance drives and libraries were released, ISVs had to rework their applications to take advantage of the new technology. With NTMS, they can write once to the NTMS API, and will instantly support any NTMS-compliant drive or library.



With NTMS, devices will be supported by the Windows NT operating system, and application developers will write to one API.

Meanwhile, NTMS will allow device/library vendors to integrate their products more easily with applications from ISVs. As a result, device/library vendors will have the opportunity to increase unit shipments and sales of robotic libraries. In the past, device vendors were forced to solicit support from the ISV community, and could not sell their drives and libraries until these vendors shipped applications that supported them. With NTMS, libraries and drives integrated with NTMS will instantly work with any NTMS-compliant application.

Because NTMS makes it possible for multiple applications to share robotic libraries, system administrators will be able cost justify the purchase of automated libraries for Windows NT networks, and library vendors will see their sales into Windows NT environments increase.

NTMS also will provide the building blocks for a new class of SRM applications. Together, NTMS and SRM applications will make management of distributed storage resources on Windows NT networks easier, cost effective and efficient.

—Tom Rose is vice president of product marketing with HighGround Systems (Boxborough, Mass.).

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When anything interrupts the normal activities of your operations center, the loss of access to critical data can put your entire business in jeopardy. Backup is a regularly scheduled routine in data centers everywhere, because it's a sound business practice. But when a complete site failure occurs, the recovery time from offsite backups, before you're fully operational again, is simply unacceptable. No one can afford to spend days or weeks trying to recover that portion of the corporate data that is critical to running the business. With only the "cold recovery" of a tape backup/restore operation available, it may take days or weeks before your business is back at peak efficiency again.

So, what are the alternatives open to you if you need continuous data access? Make your primary data storage device "bulletproof." In other words: two of everything — not just dual active controllers, but dual power and cooling, dual copies of data, dual power cords and dual power sources (in case the power grid fails). However, this is not especially practical. You still are not protected against natural disasters that physically destroy the site itself. Nor have you ensured continuous data access during periods of normal maintenance or upgrade, where hardware or software servicing requires the storage systems to be offline.

Fully replicating the data repository to a second identical unit will insure against unacceptably long restore timeframes, and the secondary unit can be put into online operations while the first unit is being serviced. But again, the cost is high. In this scenario, your price per megabyte of storage has just doubled — and you may even be paying a premium for data that isn't critical enough to warrant it. The costs will rise exponentially if the secondary (or "hot recovery") unit is not co-located, but is at remote site. In that case, the telecommunications costs will further increase the budgetary outlay.

ANNE MURPHY

However, assuming that the second site is far enough removed, you will probably be protected against the same disaster affecting both storage repositories. But, it's remotely possible that both sites will still concurrently go out of service. So, do you now need a third site at triple the cost?

Selectable levels of data protection are needed, so that you can decide what level of protection to invest in for each and every piece of data, based on how quickly the data must be available and online again. This requires multiple levels of local and remote data replication that can be customized at as low a granularity as the file level. The most critical information could be replicated at multiple, remote hot recovery sites and be immediately available, while non-critical or archival data could be stored on a low-cost tape

backup device and recovered later.

Scaling availability to the point of non-stop online access is the challenge, but storage solutions are now moving beyond disk-to-tape backup and simple hardware component redundancy to multiple levels of online and offline data redundancy. The most effective approach to business continuance is for you to be empowered with the tools to select the data recovery/data replication techniques that best fit your enterprise and your budget.

Make your primary data storage device "bullet-proof." In other words: two of everything.

User-scalable replication at the file level, rather than the storage array level is key, because it helps keep costs under control. The flexibility to combine multiple local and remote mirroring or backup techniques concurrently represents the best business value, because then you can choose the appropriate level of protection for each and every data transaction.

— *Anne Murphy is vice president of marketing with Storage Computer Corp. (Nashua, N.H.).*

Recalling the Days of DRAM Past, Present And Future

The Fondest of Memories

Picture a family photo album full of treasured memories. However, this album is different: it allows you to see the future as well as the past. For example, if you have to deal with computer memory, you'll fondly recall Dynamic Random Access Memory (DRAM). But this isn't the DRAM your father may remember.

In 1994, a DRAM data access scheme called Fast Page Mode (FPM) enabled a CPU to access new data in half the normal access time, as long as it was on the same page as the previous request. FPM has given way to Extended Data Out (EDO) memory, a form of DRAM technology that shortens the read cycle between memory and CPU. EDO memory allows a CPU to access memory 10 percent to 15 percent faster than comparable FPM chips. And now, the current hot DRAM technology is Synchronous DRAM (SDRAM), which uses a clock to synchronize signal input and output on a memory chip.

The clock is coordinated with the CPU clock so the timing of the memory chips and the timing of the CPU are "in synch." SDRAM includes an on-chip burst counter that can be used to increment column addresses for very fast burst accesses. To work with up to 100MHz clock speeds, SDRAMs are designed with two internal banks. This allows one bank to get ready for access, while the other bank is being accessed. This means SDRAM allows new memory accesses to be initiated before the preceding access has been completed.

According to Mark Moshayedi, chief operating officer at Simple Technologies (Santa Ana, Calif.), "70 percent of systems will ship with SDRAM by the end 1997." Moshayedi also notes that the 5 percent to 10 percent performance gain that SDRAM delivers over EDO will be significantly increased — 25 to 30 percent — as systems begin to use their 100MHz bandwidth capacity. Currently, most systems are limited to a 66MHz or lower bus speed. However, the performance of SDRAM will not be maximized until machines are functioning at 200MHz.

DEBORAH SCHWARTZ

According to Bosco Sun, president of Camintonn Z-RAM (Irvine, Calif.), the cost of SDRAM will be stabilized by the end of 1997. "Prices have dropped severely, especially in the April/May time frame," says Sun. "There will be a further drop, but not as much." He also notes that the traditional increase in demand in the fourth quarter will also slow down the pricing decline.

Next on the horizon is Double Data Rate (DDR) SDRAM. This is a new SDRAM specification that is currently under review by the JEDEC (Joint Electron Device Engineering Council) committee. Joe Klein, vice president of engineering at PNY Technologies (Parsippany, N.J.), is convinced DDR will be the next step in the evolution of memory. "It's easy to implement and provides added performance. It's the path of least resistance."

SDRAM with DDR uses both the trailing and leading edge of the CPU clocks to synchronize data, thereby potentially increasing the speeds of operation up to three times over EDO and conventional

SDRAM. Similar to traditional SDRAM, DDR SDRAM moves data on each clock edge, doubling the peak bus bandwidth.

Fujitsu Ltd. and NEC Corp. are looking to put DDR memory chips in workstations and servers when the chips become available in the first half of next year. And, both claim the DDR-based chips will be able to input and output data at speeds up to 1.6GBps — about twice the rate of current DRAM.

Shannon Biggs, vice president of manufacturing at Viking Components (Rancho Santa Margarita, Calif.), believes SDRAM and DDR will not go away as quickly as some people think. "For proprietary enterprise servers from HP, Sun and SGI, SDRAM and DDR will be around for longer than for the rest of the market. Those companies aren't always as quick to make changes in that area."

One Small Step For SDRAM?

In the past, DRAMs were manufactured using 4 megabit(MG) and then 16MG technology. Now, a majority of modules are using 64Mb technology. Now, early indicators predict the memory industry will jump straight from 64Mb to 256Mb DRAMs, but Samsung, NEC, Texas Instruments, Fujitsu and Hyundai already have generational half-step 128Mb products in the works. According to Bosco Sun, president of Camintonn Z-RAM (Irvine, Calif.), the market will skip 128Mb products and go directly to 256Mb. "Companies normally go for the 4x increase," notes Sun. "And we don't see a lot of interest from our customers for 128Mb products." Alan Sibert, director of marketing at Dataram Corp. (Princeton, N.J.) also believes the manufacturers are going to skip to 256Mb technology. "128Mb is too much of an anomaly. If the DRAM manufacturers can figure out [how to make] 256Mb, they will."

Lucas King, product manager of workstation memory at Kingston Technology (Fountain Valley, Calif.), disagrees and sees some OEM demand for 128Mb product, despite the fact that it's only a half-density jump. "128Mb product will be available, because the demand exists now," says King. He estimates that it will be available by the end of the 1997. This theory is confirmed by companies such as NEC, which expects to have samples of a 128Mb SDRAM ready by the first half of 1998, with product expected some time in the second half. Taking a less definitive tact, Samsung plans to keep its 256Mb production plans on schedule for 1999 and anticipates the 128Mb will "only address a temporary need."

On the other hand, King says 256Mb product is already sampling. "To get to 256Mb is possible, but yield is low so prices are high. But, demand is increasing," says King.

Get On The Rambus, Gus

Although DRAM will continue to be the memory of choice for the next few years, the competition for its replacement is taking place between Rambus (RDRAM) and SLDRAM (formerly SyncLink). Both RDRAM and SLDRAM are solving today's memory throughput problems: DRAM memory chips do not have enough bandwidth for getting the data on or off the chip. Manufacturers have to use many chips in a wide array to get the speed up to what their system needs.

Founded in 1990, Rambus has received praise from the technical community for its 600MBps DRAM interface, which is designed to run 10 times as fast as conventional DRAM interfaces. And re-cently, Intel put its stamp of approval on the RDRAM spec by entering into a joint venture with Rambus.

Rambus is essentially command-driven smart memory that coordinates with the CPU more cooperatively than old-fashioned "dumb" memory.

The only potential competitor to RDRAM is SLDRAM, a specification that semiconductor companies are currently hurrying to hammer out. Basically, SLDRAM addresses the band-

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Information storage has become a critically important element of IT managers' extended enterprise computing system environments, and continues to grow in importance as new applications drive a continuing explosion of data creation and use. This explosion of data is driving IT managers to demand ever-increasing amounts of capacity, higher data availability and faster performance from providers of storage system solutions.

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"Enterprise systems managers are clearly faced with maintaining and increasing storage system performance while rapidly adding capacity to meet their needs," said Art Lane, General Manager of HP Enterprise Storage Solutions Division. "We recognize that they not only continually need faster performance and higher capacity, but flexibility in adding and managing storage without loss of performance or functionality. Perhaps most important of all, we recognize the need for very high levels of fault resilience and data availability to keep mission-critical applications running."

HP Enterprise Storage offers best-in-class online storage that ranges from its external SCSI disk array enclosures to its self-configuring/self-optimizing disk arrays with AutoRAID technology to Fibre Channel-based High Availability Disk Arrays and very high capacity Symmetrix 3000 storage systems. HP provides near-line storage solutions with its highly reliable and fast magneto-optical (MO) jukeboxes, and also offers best-in-class off-line automated data backup storage solutions based upon Digital Linear Tape (DLT) and Digital Audio Tape (DAT). HP also supports Storage Technology's very high capacity 3480/90-compatible tape subsystems and silos. HP also recently announced a full suite of Fibre Channel products that enable 100 MB/sec throughputs. Those new products include not only Fibre Channel versions of the HP High Availability Disk Array (its Model 30/FC) and the Symmetrix 3000 Integrated Cached Disk Arrays, but a new Fibre Channel storage network hub and SCSI-to-Fibre Channel multiplexer. All HP Fibre Channel products are based upon HP-developed Fibre Channel ASIC chips that form the foundation for the vast majority of Fibre Channel products available today.

For its high-end online Data Center storage, HP partners with EMC Corp. to provide mainframe-class online storage solutions that deliver high performance in highly flexible, scaleable subsystems with up to 2.95 Terabytes of information capacity. Fibre Channel versions announced in May (HP Symmetrix Models 3700,

3400/3430 and 3300/3330) have FC host interfaces that handle up to 100 MB/sec data transfers to meet the growing performance requirements of HP's K-Class, T-600 and V-Class Enterprise Server and cluster environments.

HP's midrange online storage solutions include the recently-announced HP High Availability Disk Array Model 30/FC, which provides up to 264 GB of raw capacity per enclosure for HP's K-Class, T-600 and V-Class Enterprise Servers. These arrays are based upon an innovative architectural design that emphasizes high availability and capitalizes on the performance, flexibility and scalable benefits of Fibre Channel technology.

"We recognize the need for very high levels of fault resilience and data availability to keep mission-critical applications running."

Art Lane, General Manager,
HP Enterprise Storage Solutions Division.

All of HP's new Fibre Channel products have one important attribute common: they provide IT managers with new dimensions of flexibility and configuration capability. Fibre Channel allows for connections of up to 3 Kilometers between servers and subsystems today, with up to 10 KM distances possible as early as 1998. HP's total Fibre Channel portfolio includes an FC-AL Hub that gives system managers the means to place hosts and/or subsystems farther apart, freeing up distance constraints imposed upon them by SCSI limitations. Up to ten ports can be used per hub to attach additional subsystems or servers to a single server, enabling higher degrees of fault resilience and data availability while allowing IT managers to add more capacity. Finally, a new Fibre Channel-to-SCSI multiplexer allows IT managers to protect investments in older SCSI subsystems as well as add new SCSI-based tape subsystems. The multiplexer, or MUX, has two FC ports and 4 SCSI ports per device, and works at distances up to 500 meters to allow attachment of HP Advanced DLT Tape Libraries and Storage Technology's TimberWolf, Timberline and Redwood automated cartridge system silos.

To round out its online storage portfolio, HP offers its revolutionary HP Disk Array with AutoRAID models 12 and 12H. These self-optimizing, autoconfiguring RAID storage systems take the pain out of configuring RAID for IT managers by automatically tuning and optimizing for the best possible performance for a enterprise system manager, particularly in online transaction processing (OLTP) applications. Features such as it s Dynamic Data Migration capability, which automatically stores active data in high-performing cache or RAID 1/0 mode and places less active date in low-cost RAID 5 mode, lie at the heart of its optimization capabilities. The arrays also feature a unique Active Hot Spare, which adds to fault resiliency by ensuring that the extra spindle works when a drive goes down and needs replacement. AutoRAID's outstanding performance--verified by recent TPC-C benchmark testing--allows IT managers to meet departmental performance criteria while reducing downtime associated with conventional RAID solutions, which are more difficult to install, reconfigure and performance tune. HP Disk Arrays with AutoRAID also reduce cost of ownership thanks to its ease of installation and configuration.

HP Enterprise Storage offers both near-line and off-line storage solutions as well. Its magneto-optical jukeboxes provide IT managers with a highly reliable means to store hundreds of gigabytes of data within easy access of HP 9000 and 3000 Enterprise Servers. HP's Advanced DLT Tape Libraries and DDS-3 DAT drives provide backup and recovery capabilities for enterprise and departmental servers, and HP supports StorageTek's mainframe-class Redwood, Timberline and TimberWolf ACS tape silos. All are supported by HP's OpenView OmniBack II suite of OpenView backup management software solutions.

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width problem by using a new architecture for communicating with the DRAMs, with two highly optimized buses. SLDRAM will be an open IEEE and JEDEC standard, available to all.

The SLDRAM approach is to use moderately aggressive bus technology with a packet communication architecture. The memory controller will schedule DRAM activity by sending command/address packets to all DRAMs over a narrow unidirectional bus, called the CommandLink.

While the SLDRAM chips also can be used in lower volume, DRAM applications like graphics, set-top boxes and game machines, the consortium feels that any new memory technology must first be adopted in main memory to drive volumes up and costs down. Recently, the consortium approved Siemens quarter micron production process for the SLDRAM. MOSAID Technologies Inc. (Carp, Ontario) has been commissioned by the consortium to design the SLDRAM using the Siemens process.

King is not sure if the SLDRAM solution will pan out. "SLDRAM is built around the synchronous technology, but allows you to expand performance," says King. "For now, it is not a workable solution." And while many see the "openness" of the SLDRAM solution as a plus, they are not betting their chips on that yet.

"Companies don't like to have to buy into a proprietary solution or to have to pay a royalty to another company [as in the Intel/Rambus situation]," says King. "Still, many companies have bought Rambus licenses, are supporting SLDRAM, are working with DDR and providing EDO."

Always Remember, Never Forget

While CPU speeds have increased exponentially, memory access speeds have not. "As [systems become] faster, more noise is created; signals become tighter," says Klein. "Companies will need to insure compatibility."

The increasing cost of these new technologies, due to the need for new fabrication lines and new testing equipment, will force a consolidation of the memory market. "Before, anyone could get into the business [at a minimal expense]," says Biggs. "[These new technologies] will separate the men from the boys."

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Prism Solutions Unveils Prism Quality Manager

Prism Solutions Inc. announced Prism Quality Manager software for auditing, managing and improving the quality of data across an organization's operational and informational systems.

Enhancements include: ability to export data quality metrics; simultaneous analysis of multiple databases; support for Informix 7, Sybase 11, Oracle 7.x, Sybase System 10, Paradox 5 and Access; and Year 2000 compliance. The software is licensed as part of a SureStart Quality Bundle, offered at $70,000.

Contact Prism Solutions, Sunnyvale, CA; (800) 995-2928; info@prismsolutions.com; www.prismsolutions.com.

Circle 399 on reader card

Bradmark Inc. And Quantum Software Release StarMan

Bradmark Inc. and Quantum Software released StarMan, a client-server, GUI-based system for the HP 3000 version of MANMAN. StarMan eliminates the need for terminals or terminal emulation.

The StarMan graphical interface addresses the Manufacturing, Order Management and Sales Order Entry modules within the OMAR (Order Management Accounts Receivable) subsystem. Other modules are in the process of conversion.

StarMan runs with HP 3000s using versions MPE 5.0 or higher, and runs on MANMAN version 6.0 and higher.

Contact Bradmark, Houston, TX; (800) 275-2723; nsales@mail.bradmark.com; www.bradmark.com .

Circle 373 on reader card

Apertus Technologies Provides Enterprise/Access 2.5

Apertus Technologies Inc. announced Web browser-based access to HP 3000 applications using version 2.5 of Enterprise/Access, an application server solution for integrating host applications with the Web. Enterprise/Access is also available on the UNIX-based HP 9000 platform.

Enterprise/Access was designed to minimize programming with a powerful development studio, automatic code generation and an object-oriented framework to maximize reuse.

Contact Apertus Technologies Inc., Eden Prairie, MN; (800) 793-3509; info@apertus.com; www.apertus.com.

Circle 396 on reader card

QMS Delivers CrownAdmin 3

QMS Inc. introduced CrownAdmin 3 printer management software that centralizes and reduces management processes, allowing administrators to control QMS Crown Print Systems in real time from remote locations. CrownAdmin 3 will ship as the standard administration utility with all QMS Crown print systems.

QMS CrownAdmin 3 runs on Windows 3.x, Windows 95, Windows NT, SunOS, Solaris, HP-UX, IBM AIX, Macintosh, OS/2 and Solaris 64-bit UPA. CrownAdmin 3 will be available on a single CD-ROM shipped with QMS Crown printers and upgrade kits free of charge.

Contact QMS, Mobile, AL; (800) 523-2696; info@qms.com; www.qms.com

Circle 388 on reader card

FastLane Enhances Enterprise FINAL

FastLane Technologies Inc. introduced Enterprise FINAL.

Enterprise FINAL solves the challenges of managing multiple network operating systems, offering global or mass enterprise management of all network functions from a single point of administration.

Contact FastLane Technologies Inc., Halifax, NS; (902) 421-5353; info@fastlanetech.com; www.fastlanetech.com.

Circle 394 on reader card

Magic Software Offers Unified Development

Magic Software Enterprises announced Version 8, the Magic Enterprise Edition, which includes Internet and client-server integration capabilities, visual and dynamic application partitioning, version control, a new application management architecture, a new open API, Java client generation and applet component integration. Pricing starts at $5,500 for a single enterprise client-server development system.

Contact Magic Software Enterprises, Irvine, CA; (714) 250-1718; info@magic-inc.com; www.magic-sw.com.

Circle 393 on reader card

NobleNet Inc. Supports NetManage NEWT SDK

NobleNet Inc. announced an agreement to supply support and technology to customers using the NetManage NEWT Software Development Kit (SDK) Remote Procedure Call (RPC). Under the agreement, NobleNet technical support will answer questions about the use and function of RPC technology for NetManage's NEWT SDK RPC customers covered by a support contract.

Contact NobleNet, Southboro, MA; (508) 460-8222; newt@noblenet.com; www.noblenet.com.

Circle 390 on reader card

UniSolutions Enhances JobAcct Option

UniSolutions Associates offered an optional package for their JobAcct software. The option allows system administrators higher accuracy and greater flexibility for tracking and billing server usage for response to queries against Oracle databases. The

New From HP

HP TapeAssure and TapeAlert — HP announced HP TapeAssure, a software utility that simplifies the installation and configuration of all HP SureStore tape backup devices.

HP TapeAssure runs under Windows NT, Novell NetWare and Windows 95, and operates independently of any other software application. HP TapeAssure will ship on HP SureStore tape drives, excluding DLT library solutions, as part of the HP SureStore CD-ROM.

HP also announced that TapeAlert, HP's self-diagnostic firmware tool for recognizing tape-device storage problems, is compatible with HP OpenView for Windows, HP OpenView Network Node Manager for Windows NT, including integration with HP NetServer Assistant and Novell's Managewise for NetWare, as well as with backup administration applications from Computer Associates, Seagate Software and Stac.

HP SureStore T4e Drive — HP announced the HP SureStore T4e drive, an entry-level backup storage solution. The HP SureStore T4e drive is an external version of the HP SureStore T4i drive, a Travan tape product for PC LANs. The HP SureStore T4i/e (internal and external) products replace the HP Colorado T4000s/es products. The drive is certified for Novell NetWare, Windows NT, SCO UNIX system and Windows 95. The HP SureStore T4 products also incorporate HP TapeAssure.

HP SureStore T4 drives include Cheyenne Colorado Backup for Windows 95, Windows and DOS from Computer Associates. They offer up to 8GB compressed capacity (4GB uncompressed) and a 60MBpm compressed transfer rate. The device has a SCSI-2 interface and conforms to the QIC-3095 standard format, making it compatible with TR-4 and QIC-wide minicartridges. Price is $559.

HP SureStore DLT70e Drive — HP announced the HP SureStore DLT70e drive, which is targeted for network administrators of high-end centralized LANs, who require backup that is executed securely and effectively in the smallest-possible time frame. The new drive enables a capacity of 70GB of data (compressed) to be stored on a single tape and provides a transfer rate of 10MBps (compressed). It also incorporates an 8MB cache buffer to maximize drive performance.

The HP SureStore DLT70e drive is compatible with all major OSes, including UNIX system and Windows NT. The drive is backwards-compatible with media written on HP's SureStore DLT 30e and 40e drives, as well as non-HP DLT30 and DLT40 drives. The HP SureStore DLT70e drive is $8,000.

For more information, contact your local sales office or call (800) 533-1333.

Oracle option is priced at $2,000 per site. It also requires a licensing agreement, which starts at $2,345 for the network license. The standalone base package ranges from $1,595 to $5,445.

Contact UniSolutions Associates, Dana Point, CA; (714) 488-3960; info@unisol.com; www.unisol.com.

Circle 385 on reader card

Redstone Technologies Releases Millennium Rx

Redstone Technologies announced Millennium Rx, which allows software systems to continue running smoothly after the year 2000 without requiring time-consuming, expensive, error-prone conversion of two-digit to four-digit year representations.

It gives users the option to stay with two-digit year representations for any or all date fields. Contact Redstone Technologies Inc., Aurora, CO; (888) 766-7610; redstonehp@aol.com.

Circle 383 on reader card

Cayenne Software Links ProcessTeam

Cayenne Software announced ProcessTeam, which allows organizations to create technology-independent, high-level business models of critical business functions. ProcessTeam is based on technology from Proforma Corp. Cayenne will integrate ProcessTeam with ObjectTeam, an object-oriented analysis and design solution, and GroundWorks, a data analysis solution, thus automating the connection between business process and systems designed to support these processes.

Contact Cayenne Software, Burlington, MA;(617)273-9003;info@cayennesoft.com; www.cayennesoft.com.

Circle 384 on reader card

Bristol Technology Announces Wind/U 4.1

Bristol Technology Inc. announced Wind/U 4.1, a cross-platform development software. Wind/U 4.1 includes new support for ActiveX Template Library (ATL) and OpenGL, and contains performance gains in dialog support. Also included in this release is support for Stingray Software's Objective Grid and Objective Toolkit MFC components on UNIX.

With Wind/U 4.1, developers can write their applications on Windows 95 or Windows NT, and deploy them on Windows, UNIX, OpenVMS and OS/390.

Wind/U 4.1 runs on SunOS, Solaris, HP-UX, Digital OpenVMS, AIX and Irix. Price is $12,000.

Contact Bristol Technology Inc., Ridgefield, CT; (203) 438-6969; info@bristol.com; www.bristol.com.

Circle 381 on reader card

HARDWARE

ADIC Partners With Crossroads Systems

ADIC announced a strategic partnership agreement with Crossroads Systems Inc. The partnership allows ADIC to offer products to integrate a wide variety of storage devices with Fibre Channel networks and provides Crossroads access to an installed base of more than 20,000 tape libraries in end-user sites with complex storage needs.

Contact ADIC, Redmond, WA; (800) 336-1233; www.adic.com.

Circle 380 on reader card

Allied Telesyn Offers AT-MC101, AT-MC102

Allied Telesyn announced the AT-MC101 and AT-MC102 fast-media converters, which allow network managers to convert 100BaseTX to 100BaseFX. The ability to convert RJ45 copper ports into ST or SC fiber connections is a key requirement in managing the introduction of fiber into a copper infrastructure.

To maximize flexibility, the new media converter is available in both ST (AT-MC101) and SC (AT-MC102) fiber connector styles. The AT-MC101 and AT-MC102 also feature a MDI/MDIX crossover switch allowing the unit to connect directly to a PC, switch or hub.

Contact Allied Telesyn International, Sunnyvale, CA; (408) 730-0950; ati_sales@alliedtelesyn.com; www.alliedtelesyn.com.

Circle 379 on reader card

MTI Announces StorageWare FC

MTI Technology Corp. announced StorageWare FC, a Fibre Channel-attached subsystem.

StorageWare FC consists of an eight-drive chassis (single rackmountable shelf), an optional Fibre Channel host adapter, an optional Fibre Channel hub and associated Fibre Channel cables. The shelf uses dual 300-Watt power supplies (with dual power cords) and supports hot-swappable power supplies and disk drives.

It supports IBM AIX 4.2, with support planned for SGI IRIX 6.4, Windows NT 4.0, HP-UX 10.2 and Solaris 2.6.

Contact MTI, Anaheim, CA; (800) 999-9MTI; info@mti.com; www.mti.com.

Circle 378 on reader card

Lanier Offers MDI's Optical Jukeboxes

Micro Design International Inc. (MDI) announced its partnership with Lanier Worldwide Inc. MDI will supply its writable optical jukeboxes to Lanier, for a complete document management solution. Lanier will offer MDI's family of writable optical libraries as part of its complete online imaging solution. Lanier also will bundle its software with MDI's optical jukeboxes, for improved productivity and instant access to scanned and third-party documents, as well as COLD data.

Contact MDI, Winter Park, FL; (800) 228-0891; info@mdi.com; www.mdi.com.

Circle 377 on reader card

nStor Introduces CR8j Storage Enclosure

nStor Corp. Inc. introduced the CR8j. Featuring a 9- x 12-inch desktop footprint, the CR8j provides Ultra/Wide SCSI performance (up to 40MBps) in an eight-bay mini-tower enclosure. The highly scalable enclosure supports up to eight 1-inch or 1.625-inch 4GB or 9GB disk drives, offering up to 72GB of desktop storage per enclosure. An Ultra Extender Feature Card provides additional scalability by enhancing the Ultra/Wide SCSI signal to allow daisy-chaining up to three CR8j enclosures for a total of 216GB of desktop storage to meet the most demanding storage needs for any host environment.

The CR8j enclosure is available in a four or eight disk drive configuration, using 4GB or 9GB disks drives (either 7200 rpm or 10,000 rpm) with slide mounting rails and a dual-bus module. Options available include the single-bus module, an Ultra Extender Feature Card and a Differential Converter Card. Pricing for a 16GB CR8j configuration starts at $6,570.

Contact nStor Corp. Inc., Lake Mary, FL; (407) 829-3500; sales@nstor.com; www.nstor.com.

Circle 376 on reader card

Olicom Unveils OC-8600

Olicom unveiled the CrossFire Token-Ring Switch (OC-8600). Using Olicom's ATM uplinks, the OC-8600 gives Token-Ring network managers a flexible, cost-effective and investment-secure migration path to ATM as a backbone technology.

Performance is 1.624 million packets per second and an internal latency as low as 23 microseconds. The OC-8600 can be expanded through stacking to accommodate up to 224 ports. It provides plug-and-play installation with native support for all bridging modes.

Contact Olicom, Plano, TX; (972) 423-7560; www.olicom.com.

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Forget NT, Learn COBOL

James H. Zisch, Systems Engineer Acucobol Inc.

Although I am a systems engineer for Acucobol Inc., I often find myself in another role: that of an information provider at a trade show. That's a technical way of saying I deliver seminar speeches and presentations. The topic usually focuses on my forte — pre-sales technical support of our various COBOL application development tools.

During the past few years, many have claimed that COBOL is a dead language. I naturally disagree. And you may not believe it, but in the 21st century, COBOL will be even more vital and important than ever. New programming languages like C, C++ and Java just don't handle business processes as well as COBOL. But because COBOL is not a glamorous New Age language like Java, there is a critical shortage of COBOL programmers.

After speaking in a seminar entitled *How To Leverage Your Existing Assets On The Web* at HP World in Chicago this past August, I was on my way back to the airport when I discovered that new COBOL programmers may not be coming from the usual backgrounds. Striking up a conversation with my cab driver, I discovered that he was taking computer courses at Columbia University and was, in fact, studying COBOL.

He told me that although he had his engineering degree and had programmed as an engineer, he was required to have certification in order to secure employment as a programmer. Thinking that he might just be interested in a extracting a sizable tip, I tested him. And he held his COBOL textbook up with a proud smile.

The driver and I discussed a version of COBOL that provides the same platform independence Java is touted to eventually provide, with portable program objects running against platform-specific runtimes — write, compile once and deploy anywhere. And, a COBOL with a GUI is much easier to use than C++ syntax. He commented on how his advisors and instructors had conveyed the importance of COBOL. And, that after taking his first programming classes, he quickly learned of COBOL's significance in business worldwide.

He was the second cab driver during my week in Chicago who had told me that they were studying COBOL! I had been aware of doctors and nurses going back to school to learn COBOL, but add cab drivers and you begin to get a picture.

Recently, we moved a major fast food retailer's mission-critical application system to an HP 9000 platform, while leaving the data resident on the mainframe. COBOL has advanced to a point of sophistication that when I recently contacted that customer to learn of the configuration specifics to implement the solution, they weren't certain how their client actually deployed the system. It was transparent to the COBOL application.

More than 80 percent of the worldwide business applications are being sourced in COBOL. Anyone following the approval process of the current ANSI COBOL draft knows that COBOL is not only alive but doing quite well. Businesses succeed by leveraging assets, and data supported by their COBOL application systems is one of their most significant assets. That is why COBOL has persisted as the computer source code of choice for the last two decades. And will continue to do so.

—James H. Zisch is a systems engineer at Acucobol Inc. (San Diego, Calif.). If you think COBOL is cool, drop a line to jzisch@acucobol.com.

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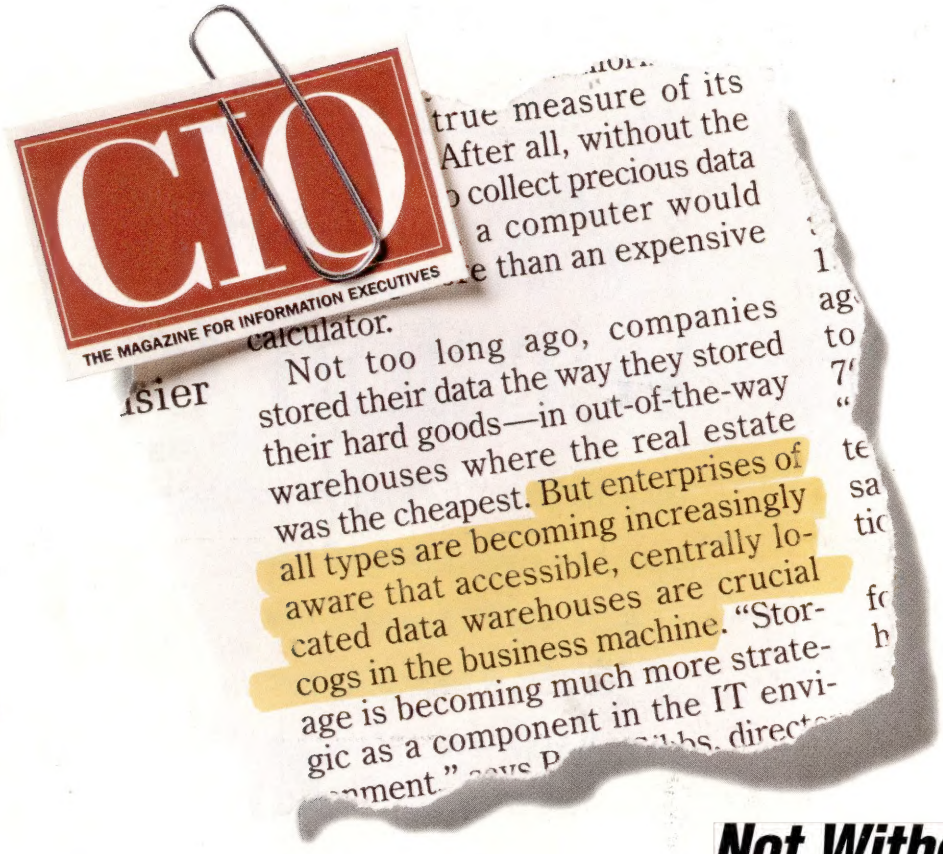

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